

KIC 004150701

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R_{\star} (R_{\odot})	T_{\star} (K)	R_p (R_{\oplus})	S_p (S_{\oplus})
004150701-01	OBS	6110.01	8.653223	134.291394	447.7	2.741	12.5	12.9	0.70	4746	1.79	40.59
004150701-02	OBS	No	8.653143	136.646135	401.7	2.772	12.1	12.0	0.70	4746	1.53	40.59

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004150701-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_KIC_POS—HALO_GHOST—EPHEM_MATCH
004150701-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_KIC_POS—HALO_GHOST—EPHEM_MATCH

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

Ephemeris Match Information For 004150701-01

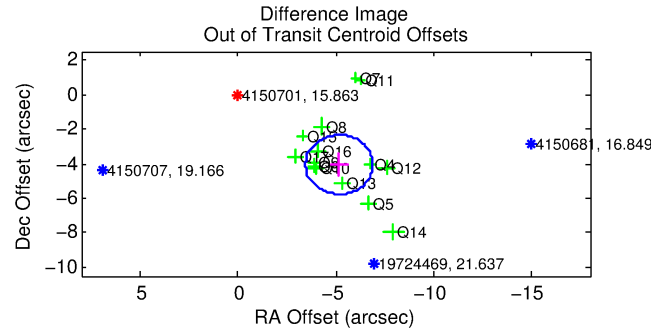
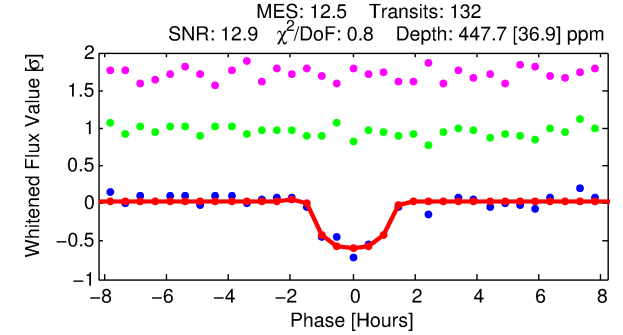
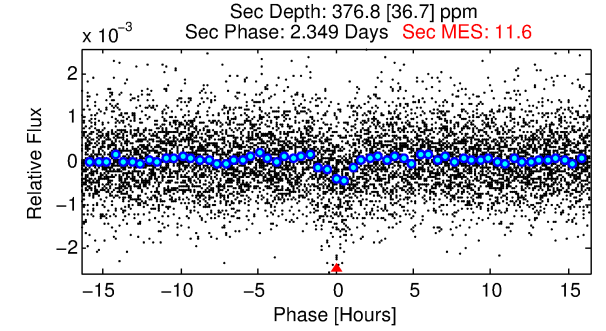
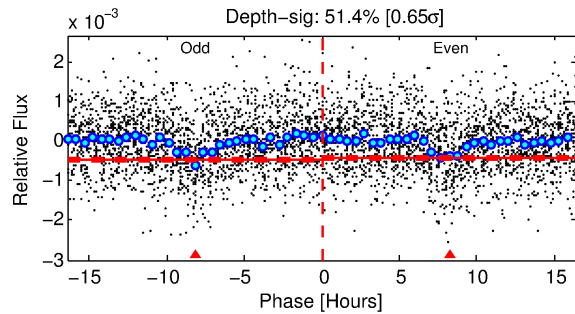
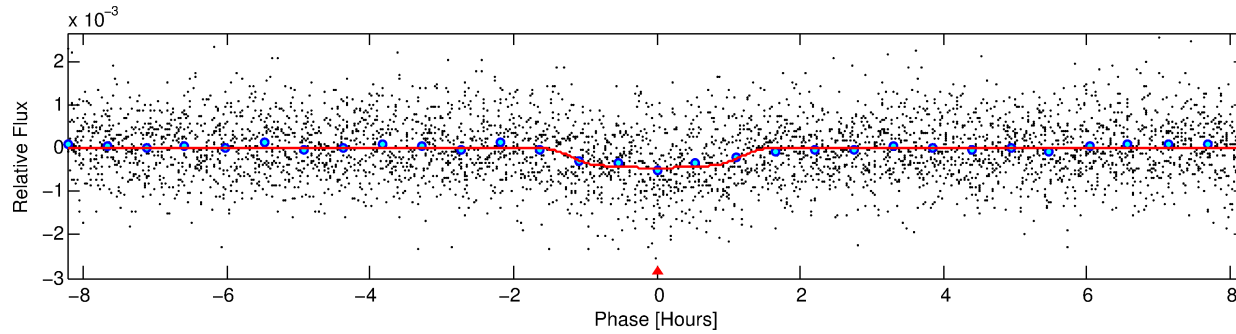
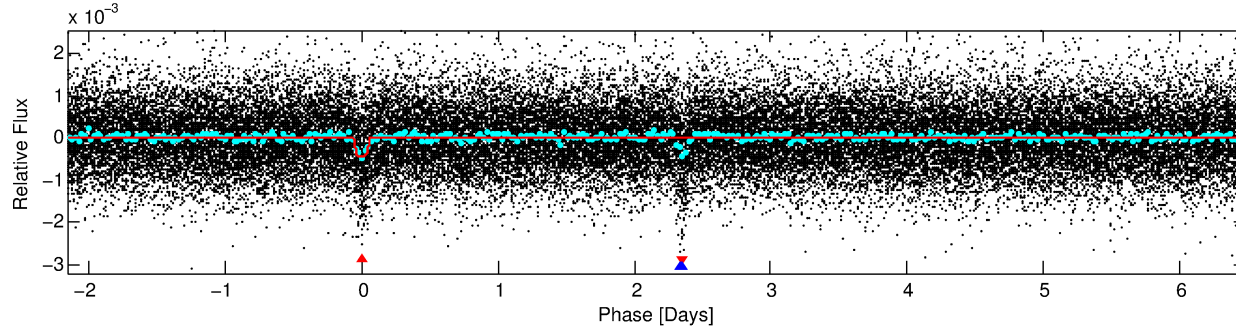
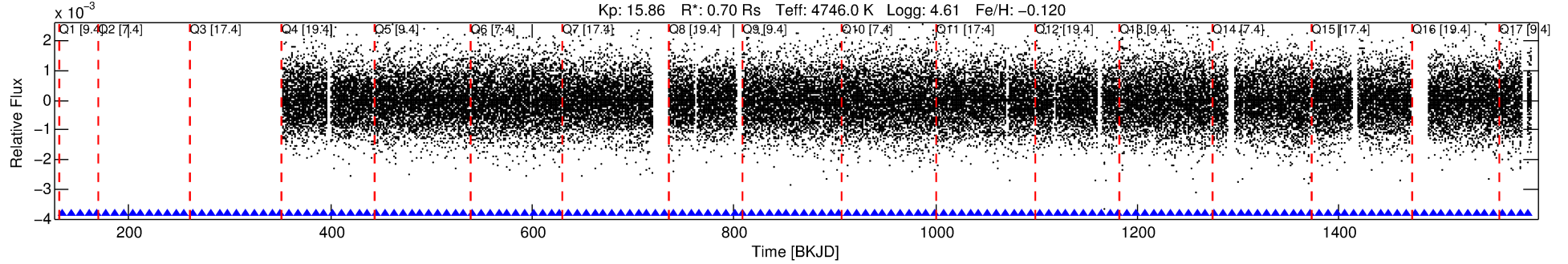
TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist (μ)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
004150701-01	4150701	004150611-02	4150611	1:1	97.5	-24	1	7.90	15.86	120.86	Direct-PRF	0	0.54	0.37

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 4150701 Candidate: 1 of 2 Period: 8.653 d
KOI: K06110 Corr: No Ephemeris Match

Kp: 15.86 R*: 0.70 Rs Teff: 4746.0 K Logg: 4.61 Fe/H: -0.120



DV Fit Results:

Period = 8.65322 [0.00006] d
Epoch = 134.2914 [0.0055] BKJD
Rp/R* = 0.0235 [0.0107]
a/R* = 12.20 [20.46]
b = 0.89 [0.41]
Seff = 40.59 [6.78]
Teq = 644 [27] K
Rp = 1.79 [0.83] Re
a = 0.0737 [0.0050] AU
Ag = 351.63 [323.89] [1.08σ]
Teff = 4309 [1000] K [3.66σ]

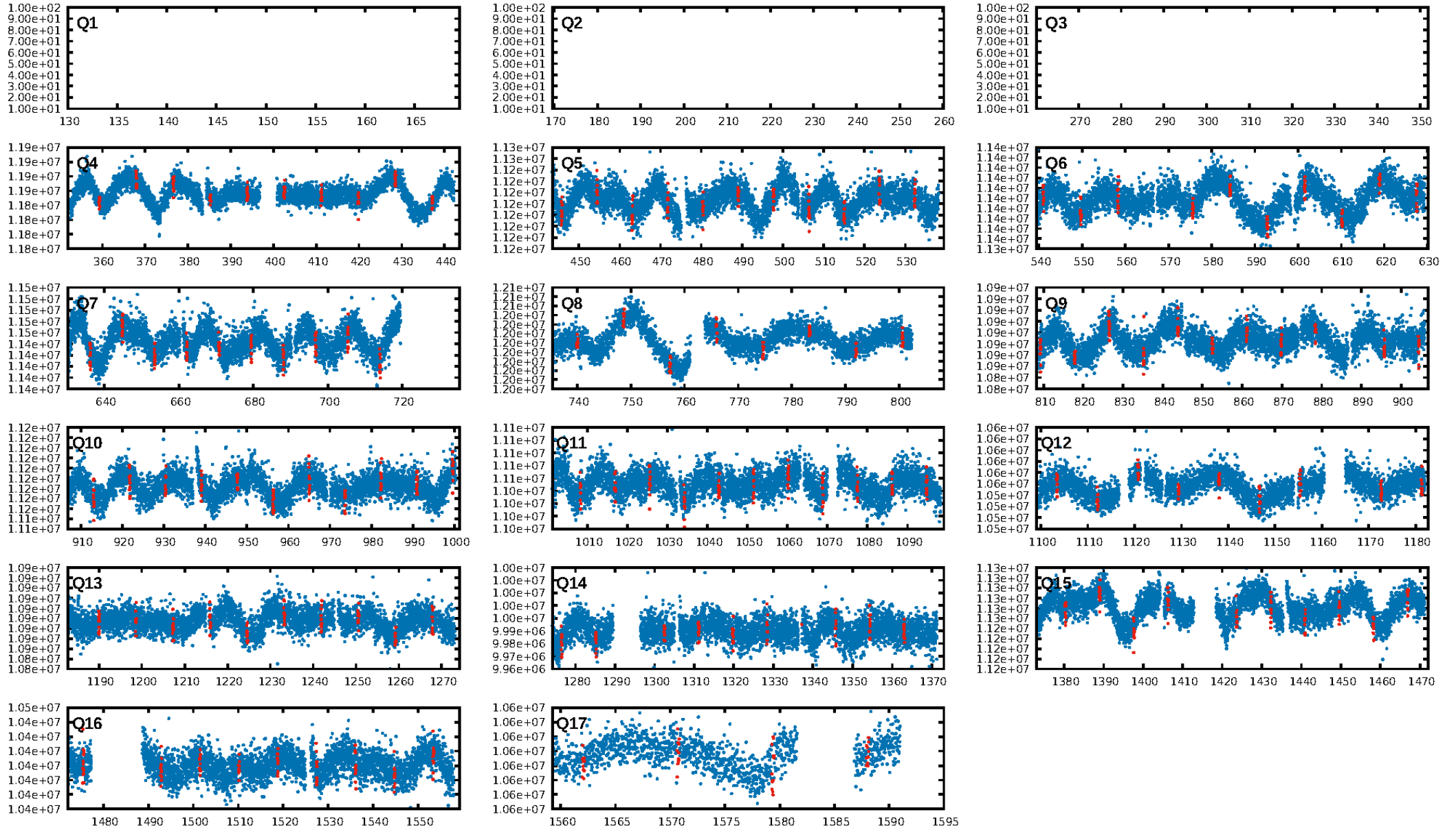
DV Diagnostic Results:

ShortPeriod-sig: 0.0% [0.00σ]
LongPeriod-sig: N/A
ModelChiSquare2-sig: 69.3%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 6.20e-35
RollingBand-fgt: 1.00 [128/128]
GhostDiagnostic-chr: 0.1908
Centroid-sig: 0.0%
Centroid-so: 2.558 arcsec [6.68σ]
OotOffset-rm: 6.567 arcsec [11.50σ]
KicOffset-rm: 3.189 arcsec [5.78σ]
OotOffset-st: 3/3/4/4 [14]
KicOffset-st: 3/3/4/4 [14]
DiffImageQuality-fgm: 0.14 [2/14]
DiffImageOverlap-fno: 1.00 [14/14]

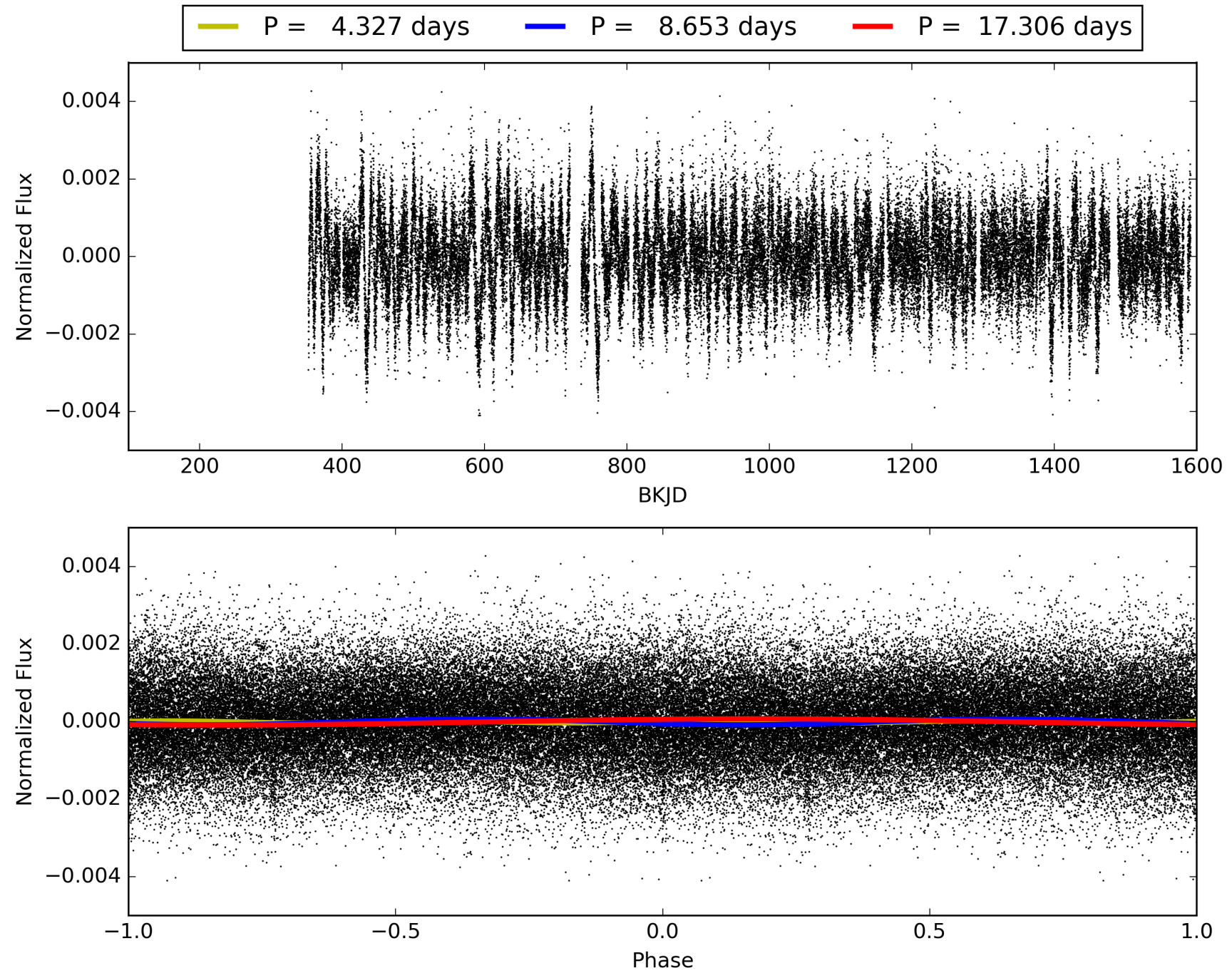
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:12:10 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 004150701-01, PDC Light Curves

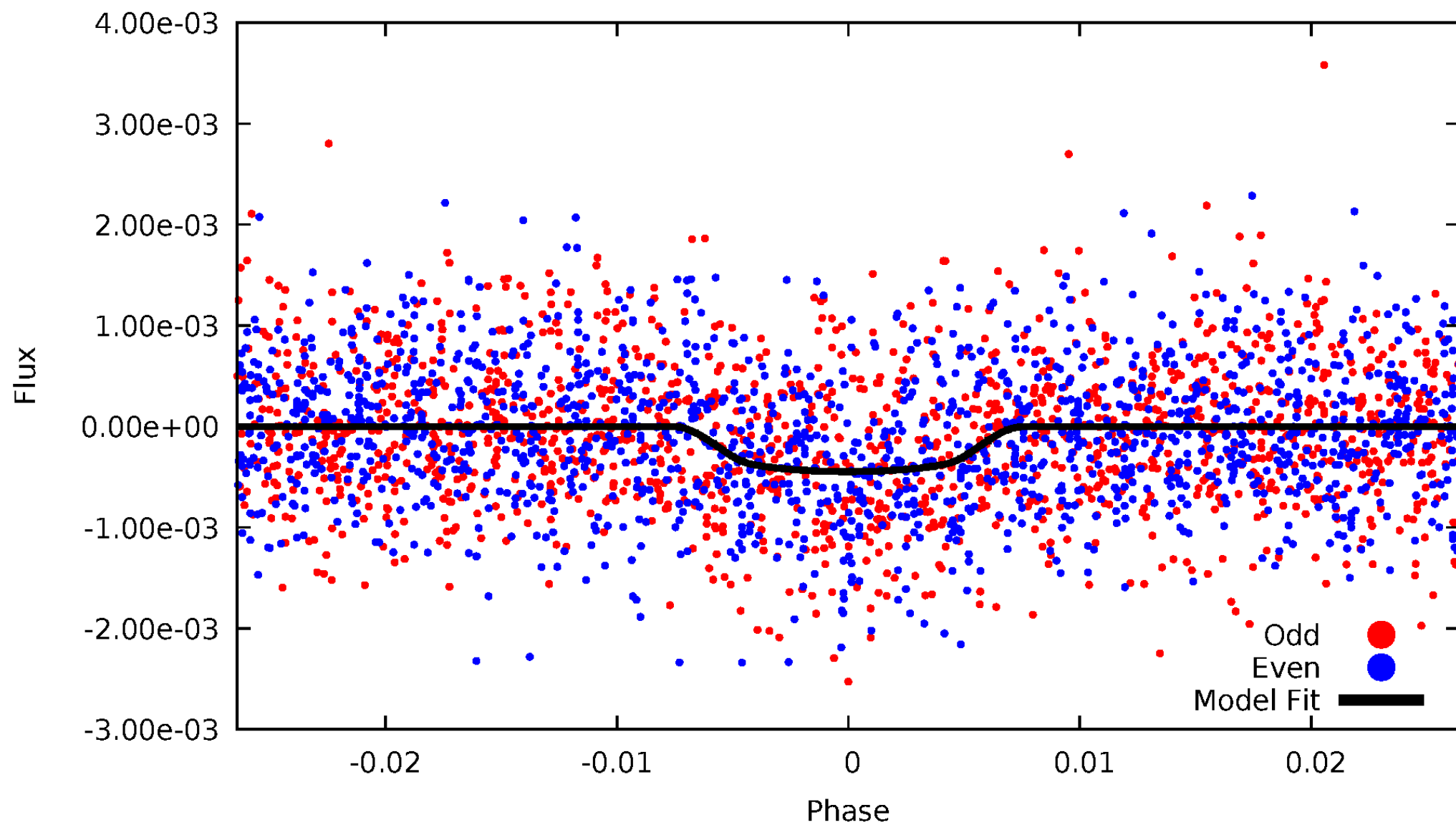


TCE 004150701-01



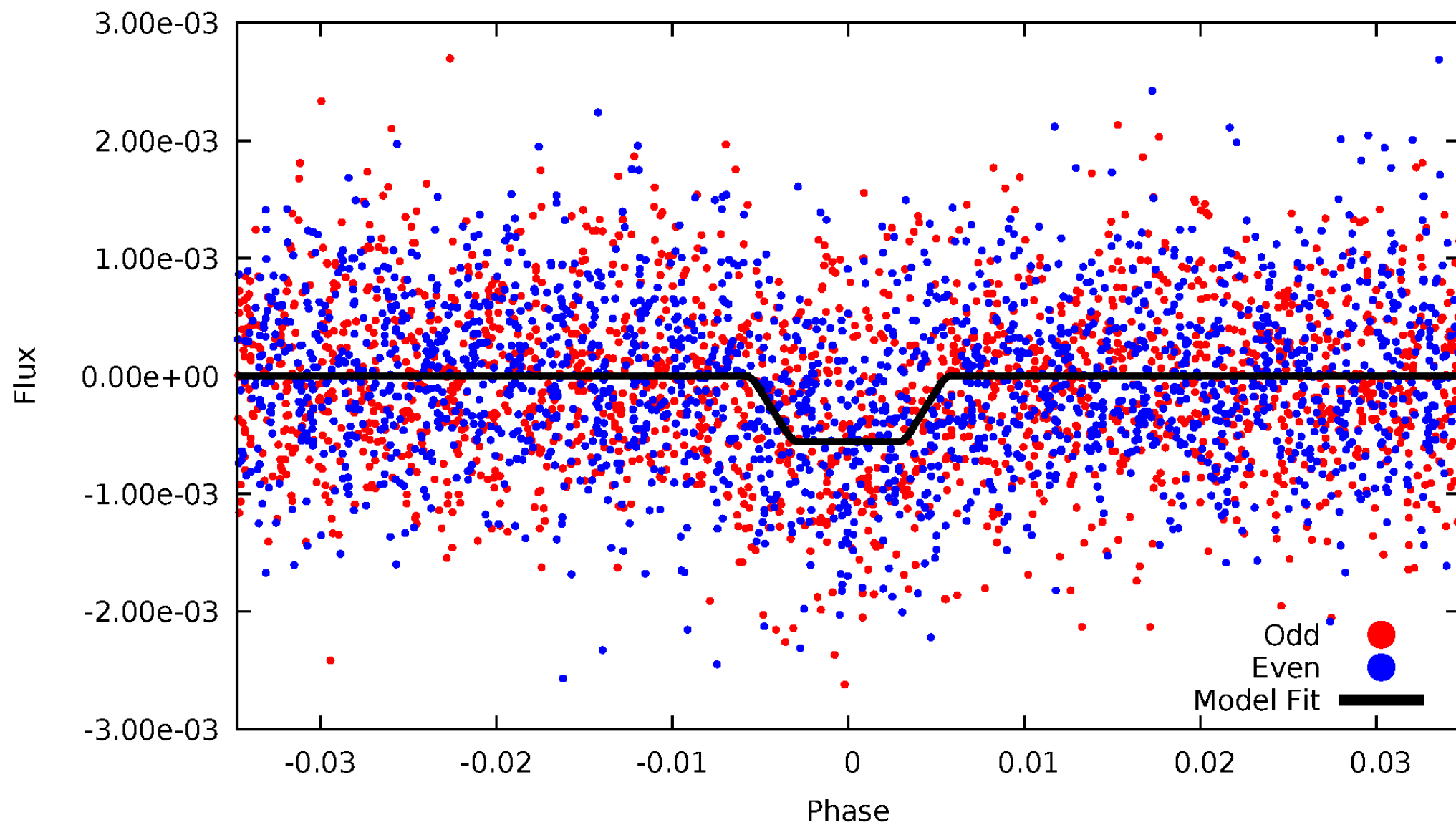
DV Odd/Even

TCE 004150701-01



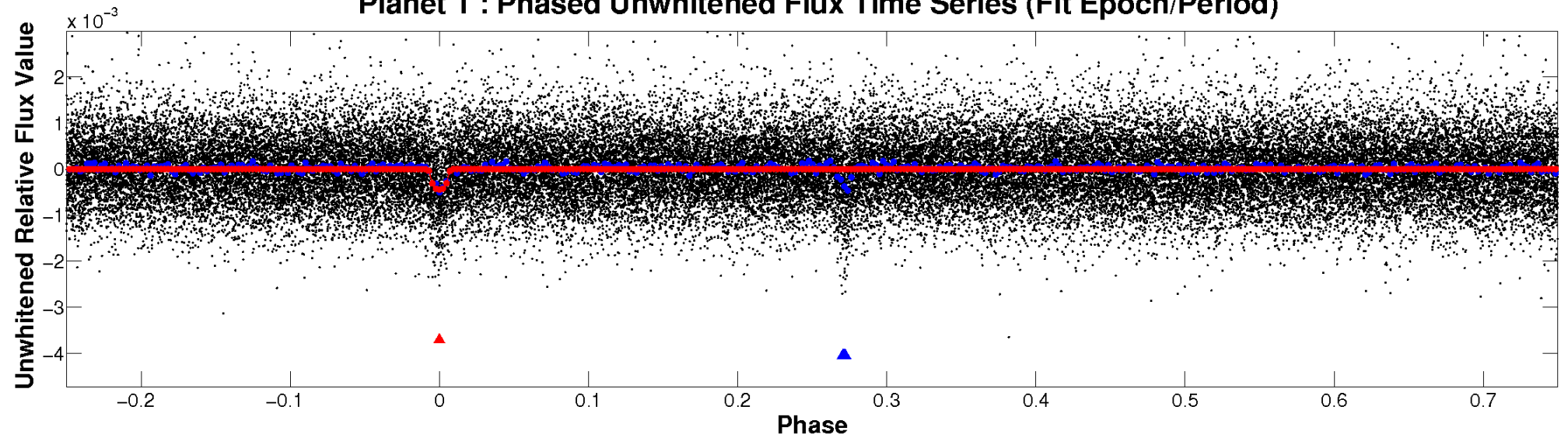
ALT Odd/Even

TCE 004150701-01

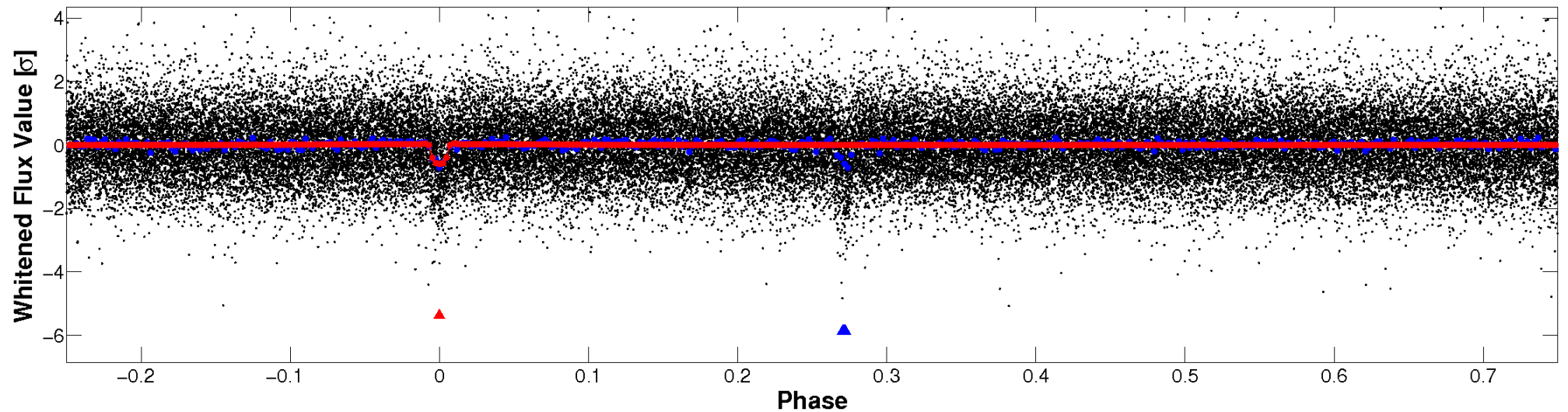


Non-Whitened Vs. Whitened Light Curve

Planet 1 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

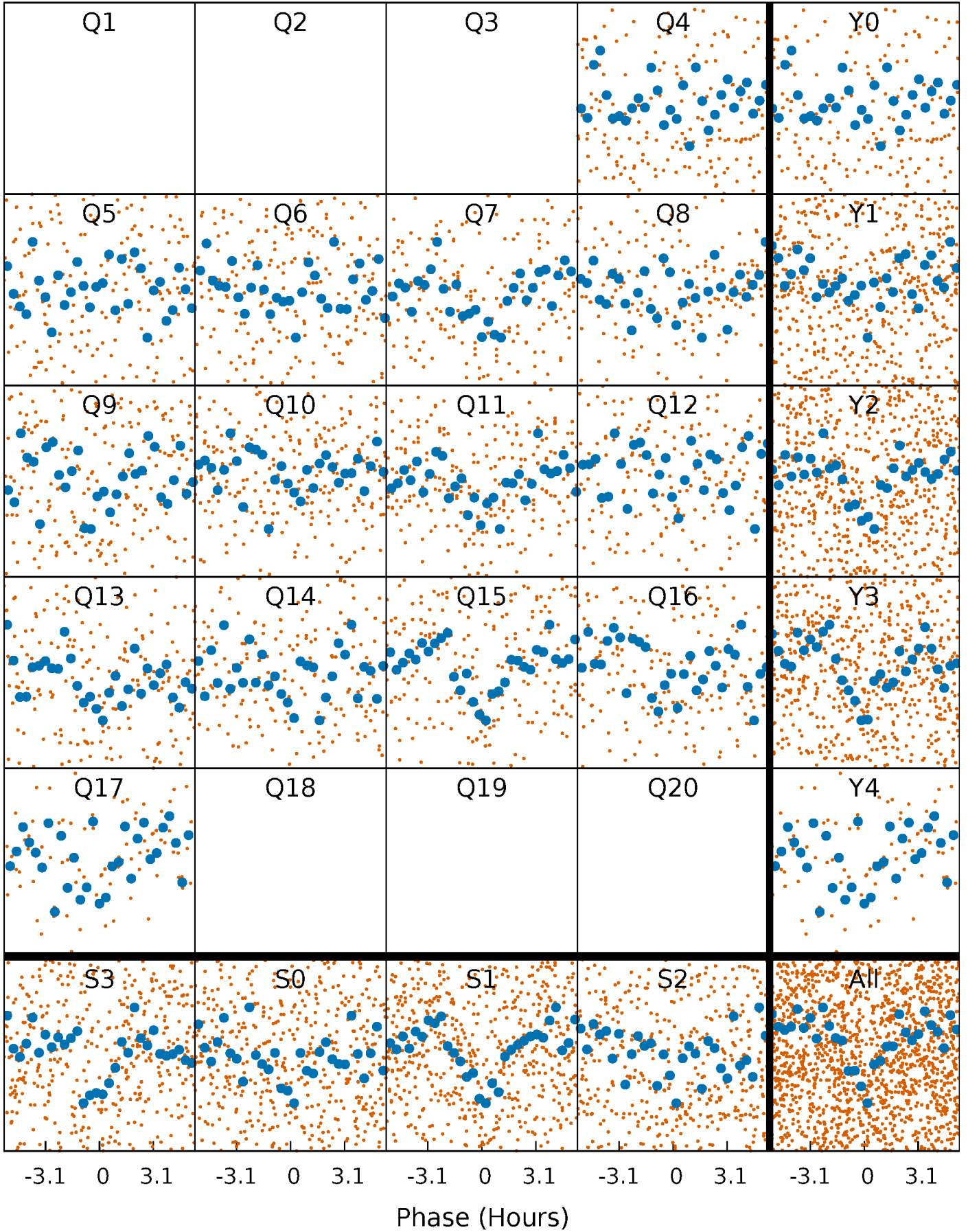


Planet 1 : Phased Whitened Flux Time Series (Fit Epoch/Period)



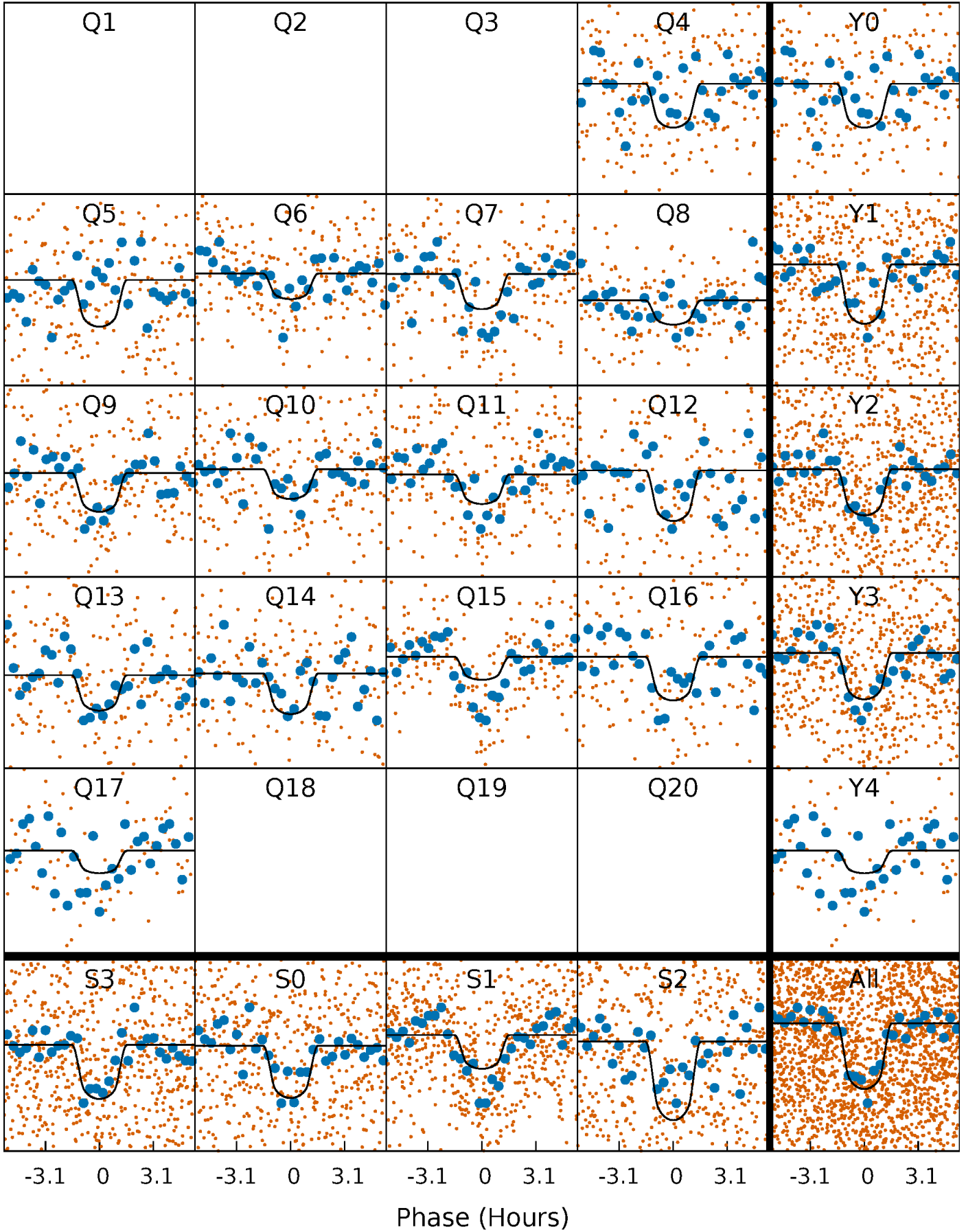
PDC Quarter-Phased Transit Curves

TCE 004150701-01 P= 8.653223 Days $T_0=134.291394$ (BKJD)



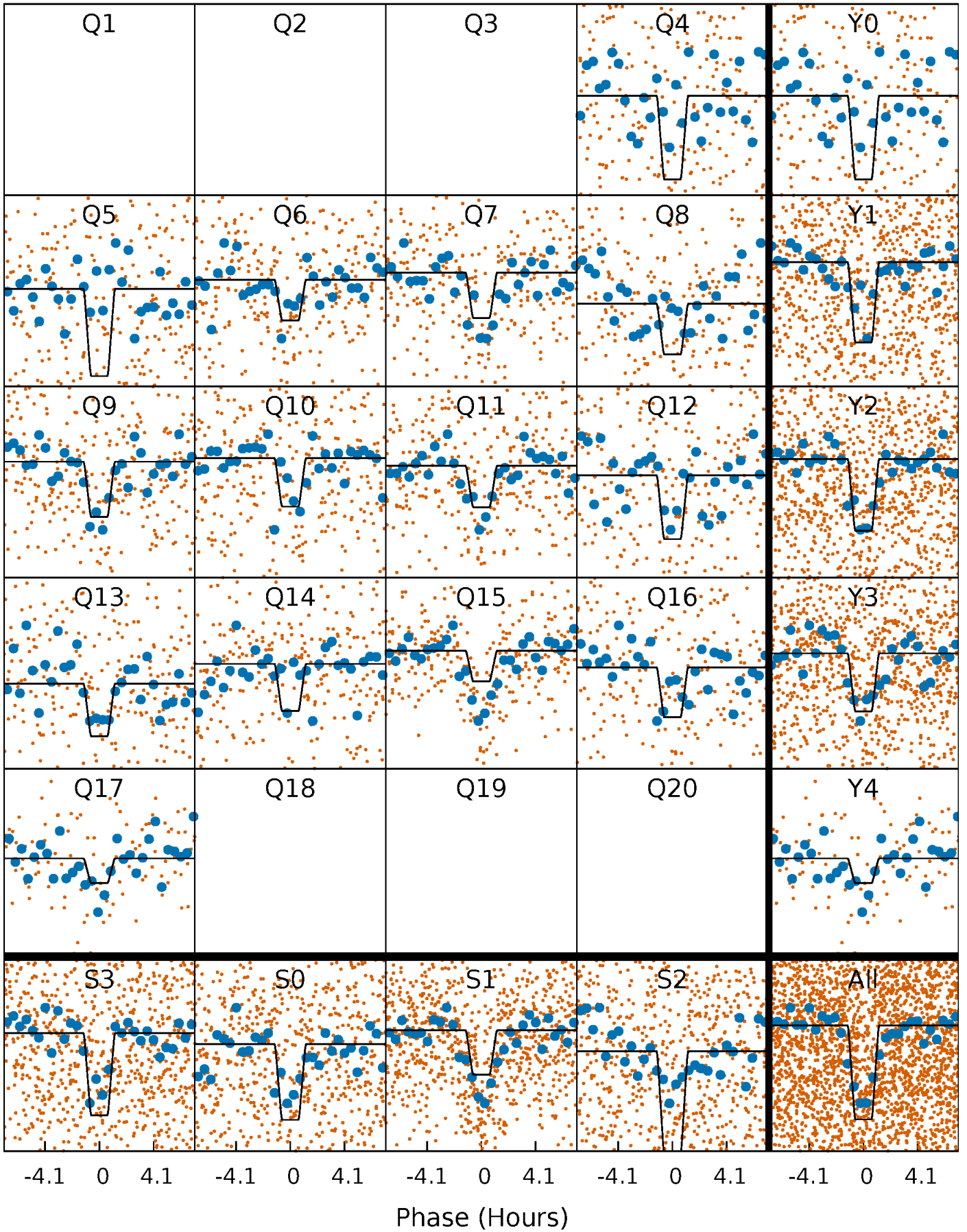
DV Quarter-Phased Transit Curves

TCE 004150701-01 P= 8.653223 Days $T_0=134.291394$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

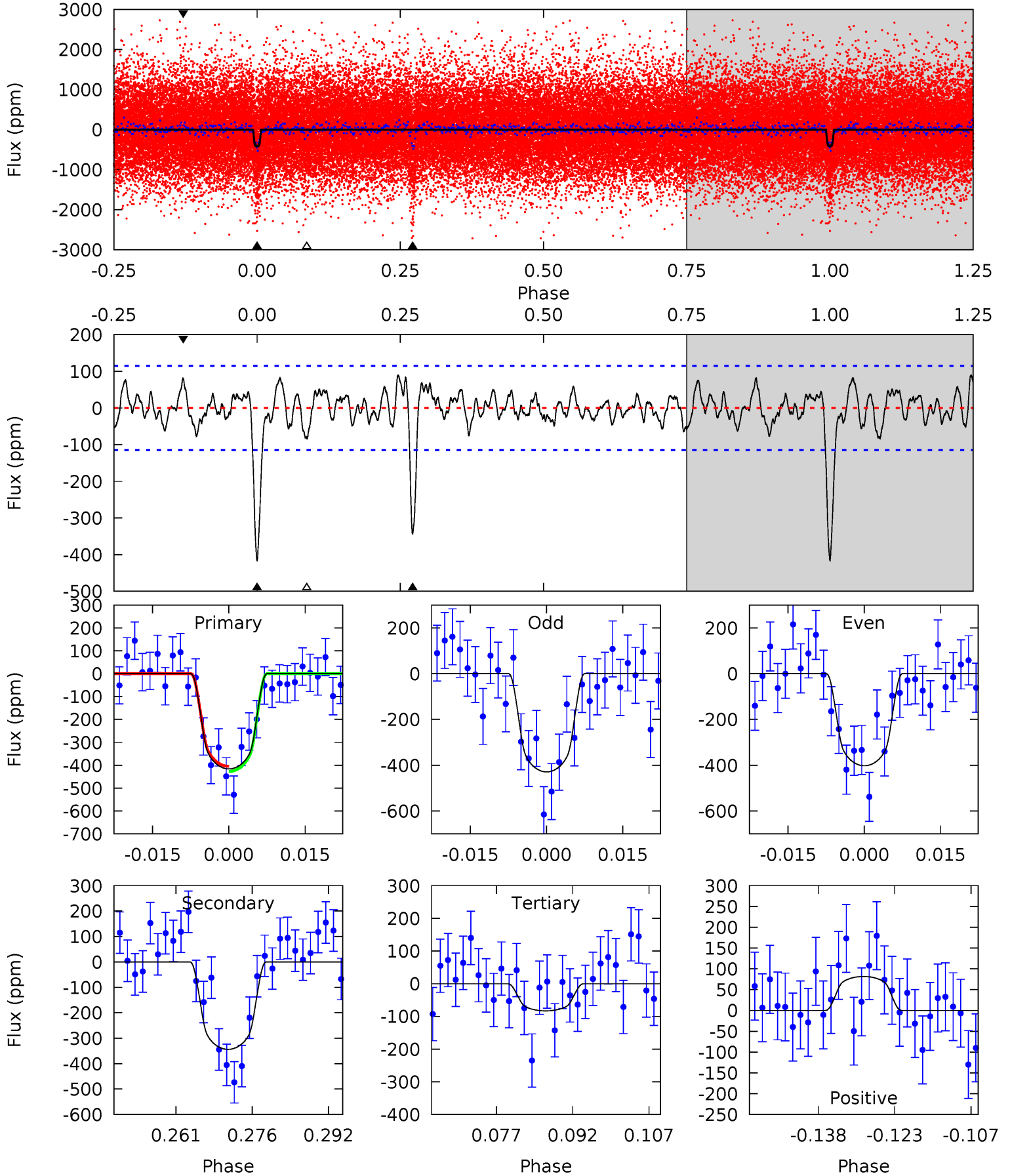
TCE 004150701-01 P= 8.653219 Days $T_0=134.293358$ (BKJD)



DV Model-Shift Uniqueness Test

004150701-01, P = 8.653223 Days, E = 134.291394 Days

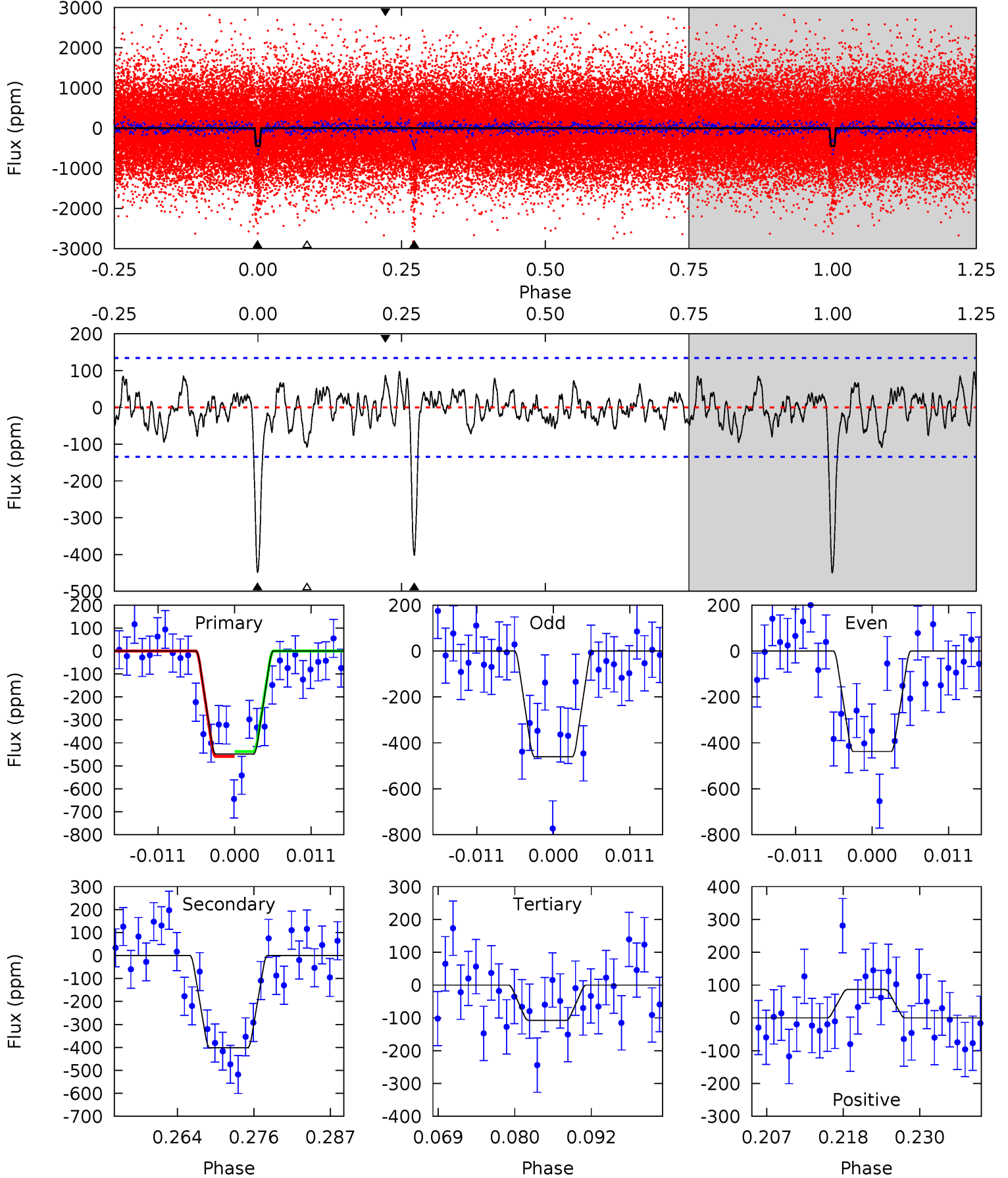
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.9	14.8	3.57	3.51	4.94	2.42	1.39	14.3	14.4	11.2	11.3	0.58	0.95	0.18	0.48



Alt Model-Shift Uniqueness Test

004150701-01, P = 8.653219 Days, E = 134.293358 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
16.7	15.0	4.01	3.22	5.00	2.53	1.30	12.7	13.5	11.0	11.7	0.41	0.97	0.18	0.40



Stellar Parameters For KIC 004150701

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	4746^{+170}_{-170}	$4.605^{+0.040}_{-0.040}$	$-0.120^{+0.300}_{-0.300}$	$0.696^{+0.063}_{-0.057}$	$0.713^{+0.071}_{-0.065}$	$2.974^{+0.599}_{-0.453}$
	+4%/-4%	+1%/-1%	+250%/-250%	+9%/-8%	+10%/-9%	+20%/-15%
Source	KIC0	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 004150701-01 / KOI 6110.01

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-344 ± 23	$1.79^{+0.88}_{-0.78}$	900^{+36}_{-36}	4315^{+1234}_{-558}	322^{+697}_{-172}
Alt.	-402 ± 27	$1.82^{+0.84}_{-0.77}$	901^{+39}_{-38}	4445^{+1091}_{-591}	362^{+782}_{-191}

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming $A=0.3$)

A_{obs} = Observed Albedo (Assuming $T=0$)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

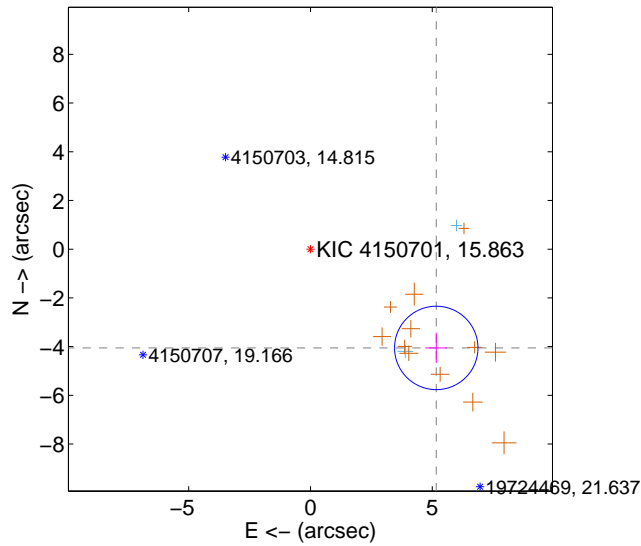
Supplemental centroid analysis for 004150701-01. Kepler magnitude: 15.86. Transit SNR 12.93

There are 2 quarters with good PRF difference image offsets

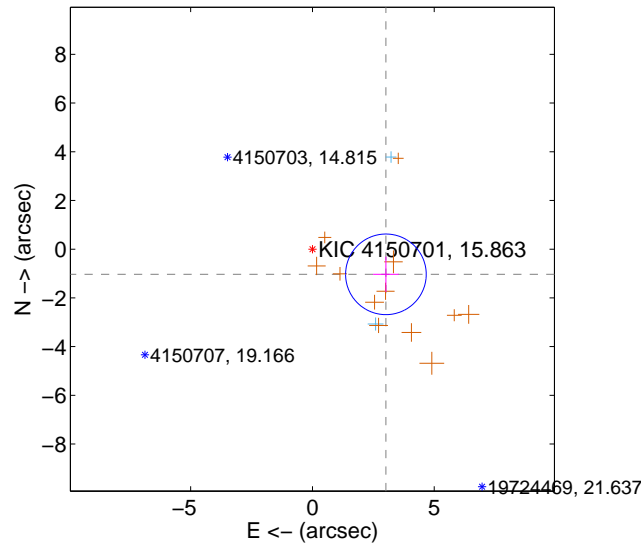
The OOT PRF centroid is offset from the target star catalog position by about 4.01 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	6.567 ± 0.571	11.50	-5.165 ± 0.452	-4.055 ± 0.620
PRF-fit source offset from KIC position	3.189 ± 0.552	5.78	-3.017 ± 0.528	-1.033 ± 0.723
photometric centroid source offset	2.56 ± 0.38	6.68	-2.51 ± 0.38	-0.49 ± 0.40

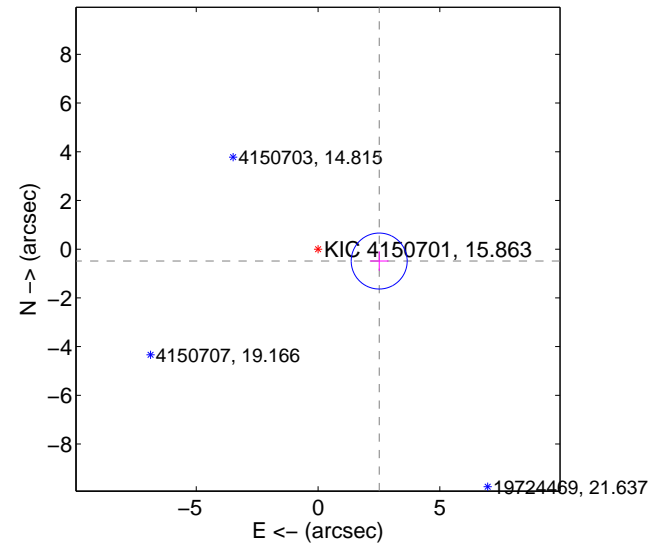
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

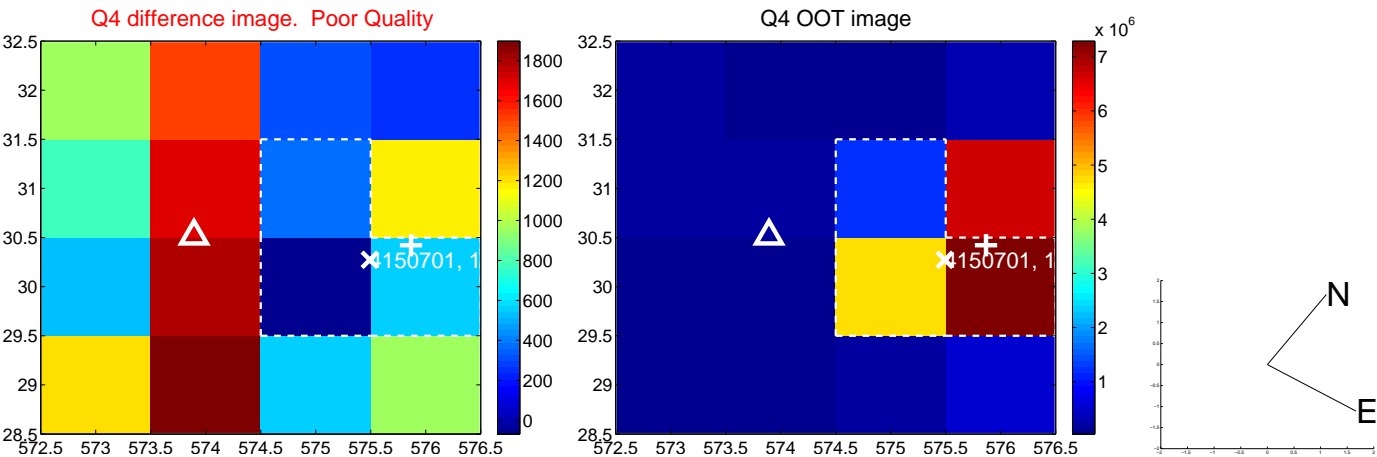


offset from photometric centroids

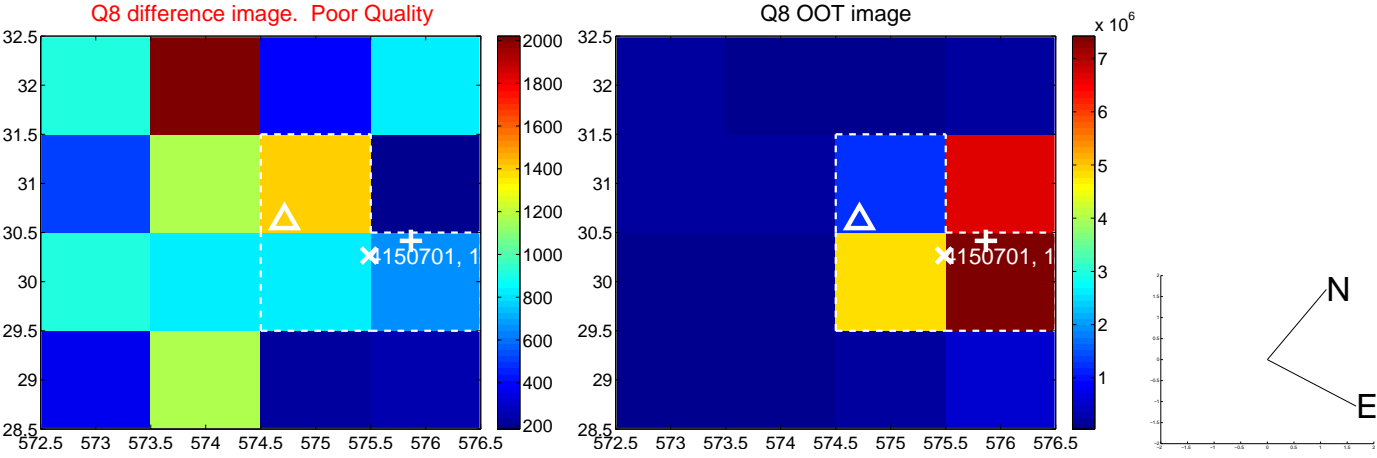
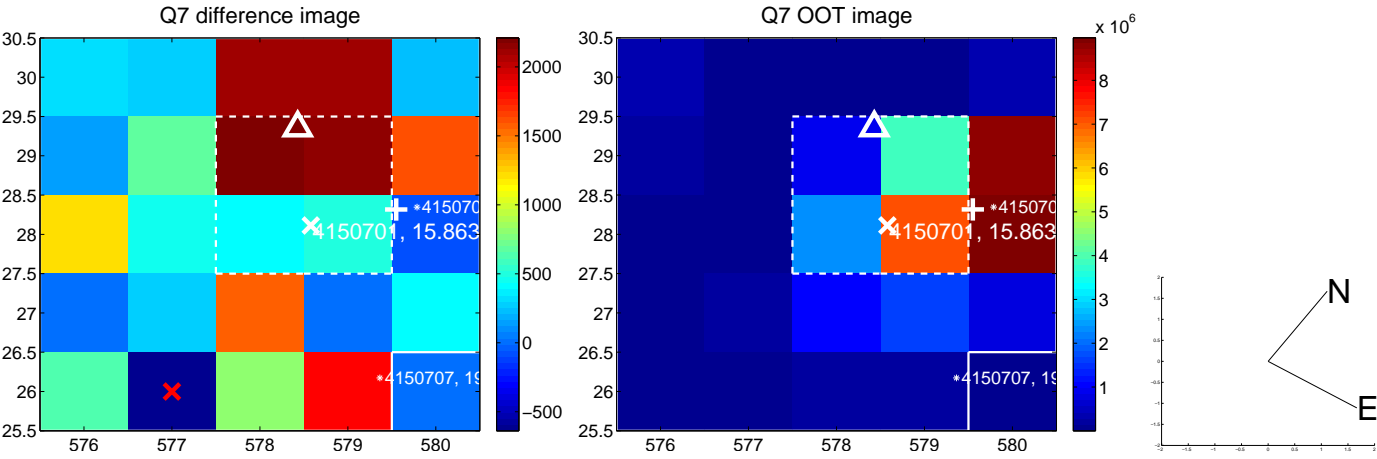
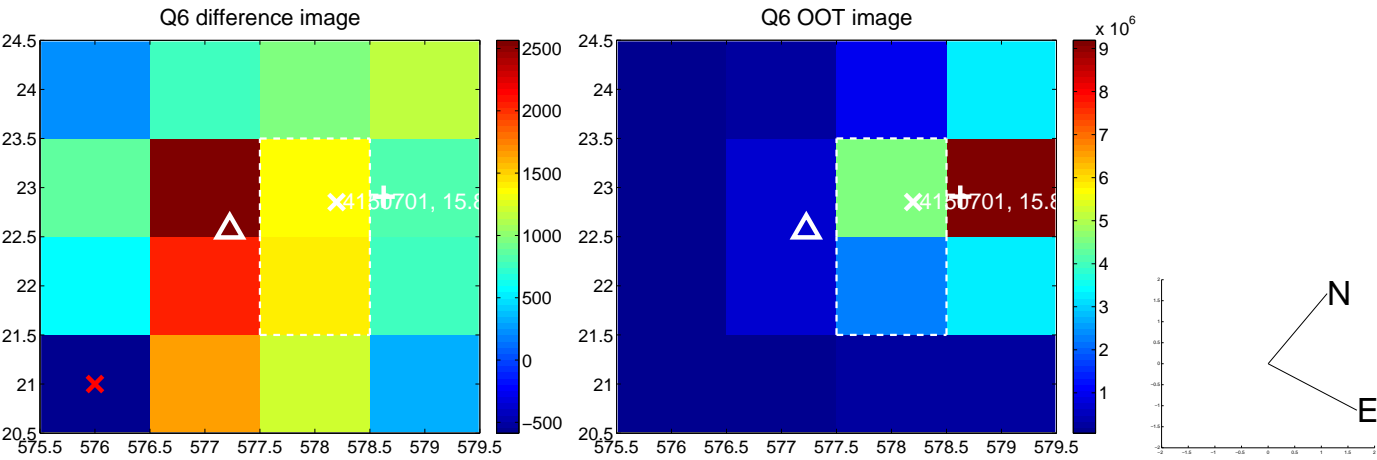
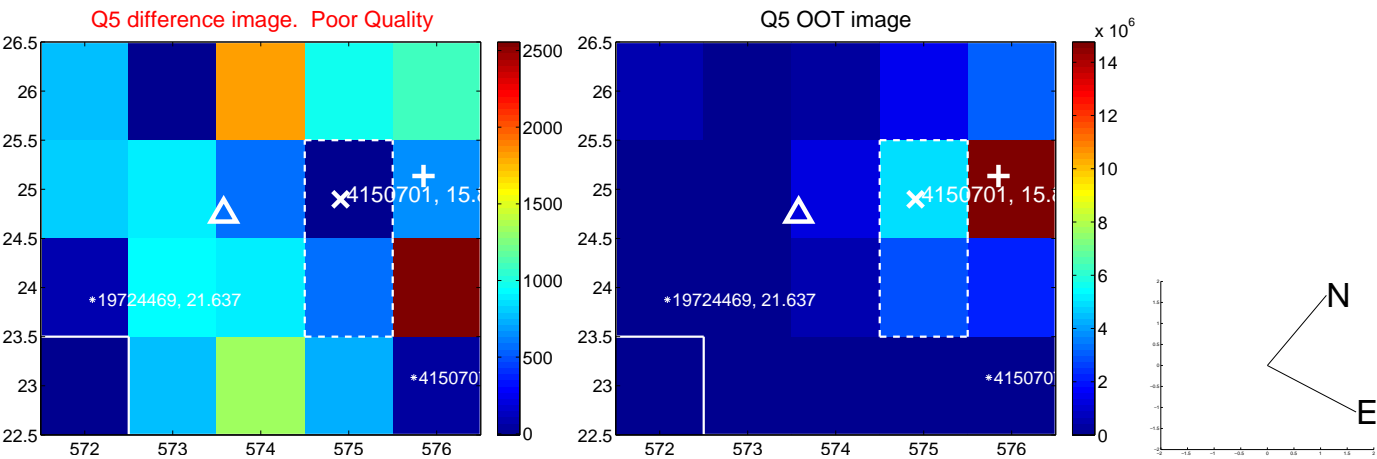


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

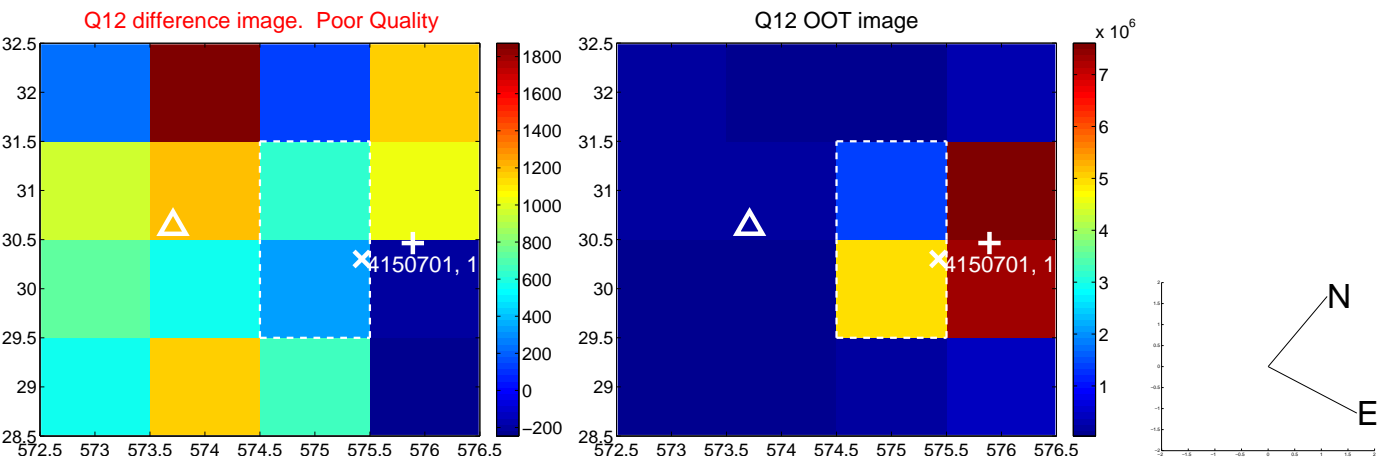
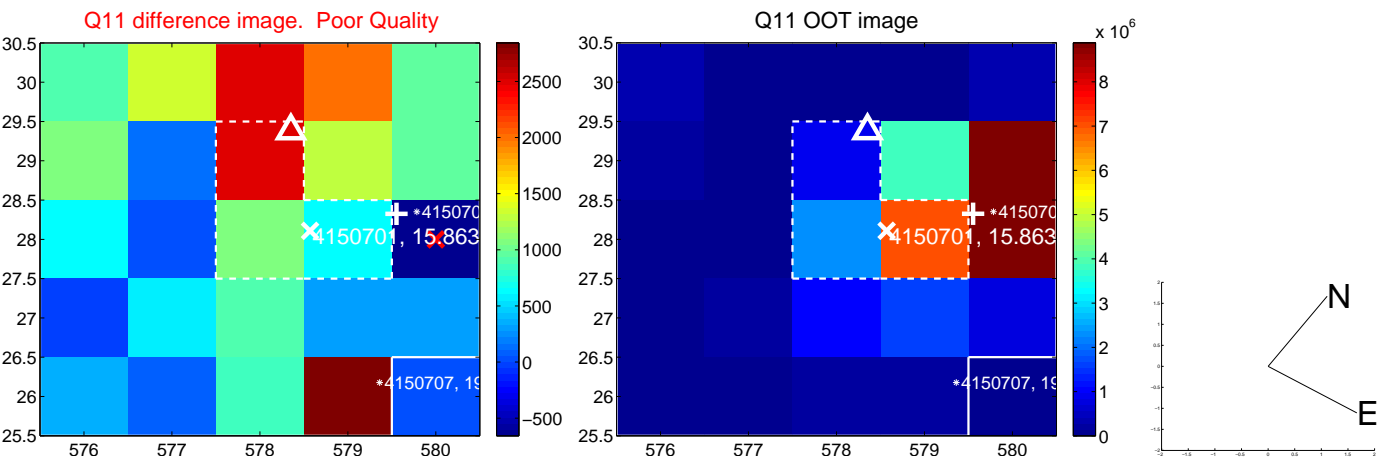
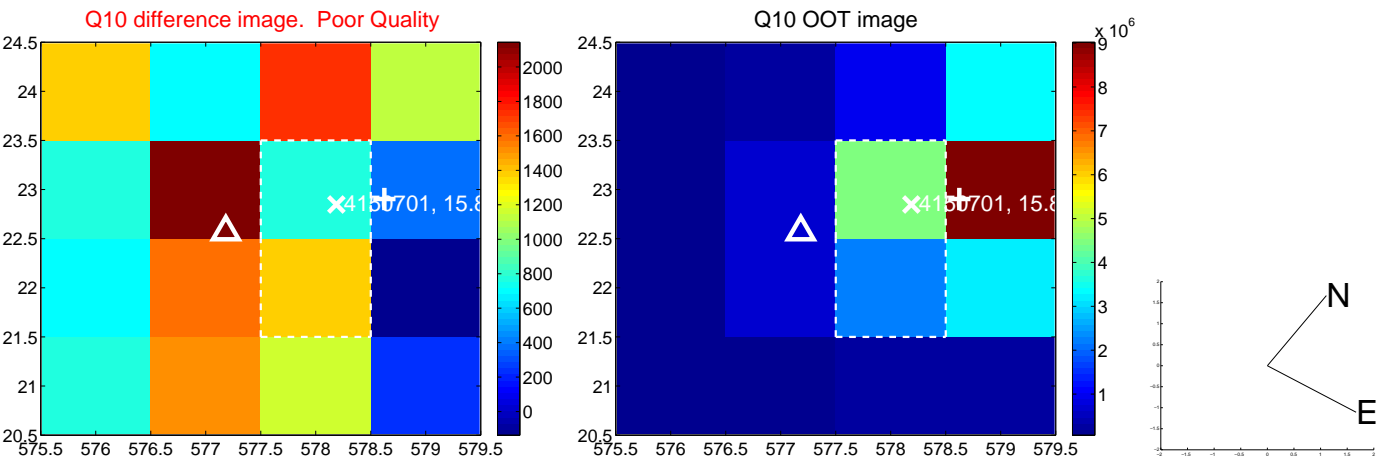
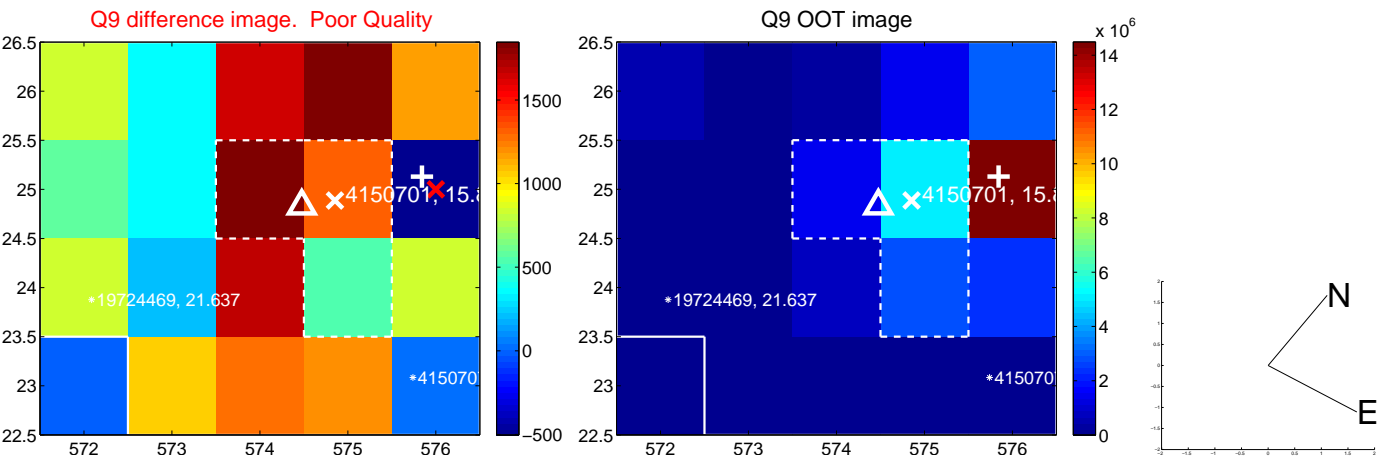
white ×: KIC target position; +: OOT centroid; △: difference centroid. red ✕: large negative pixel value.



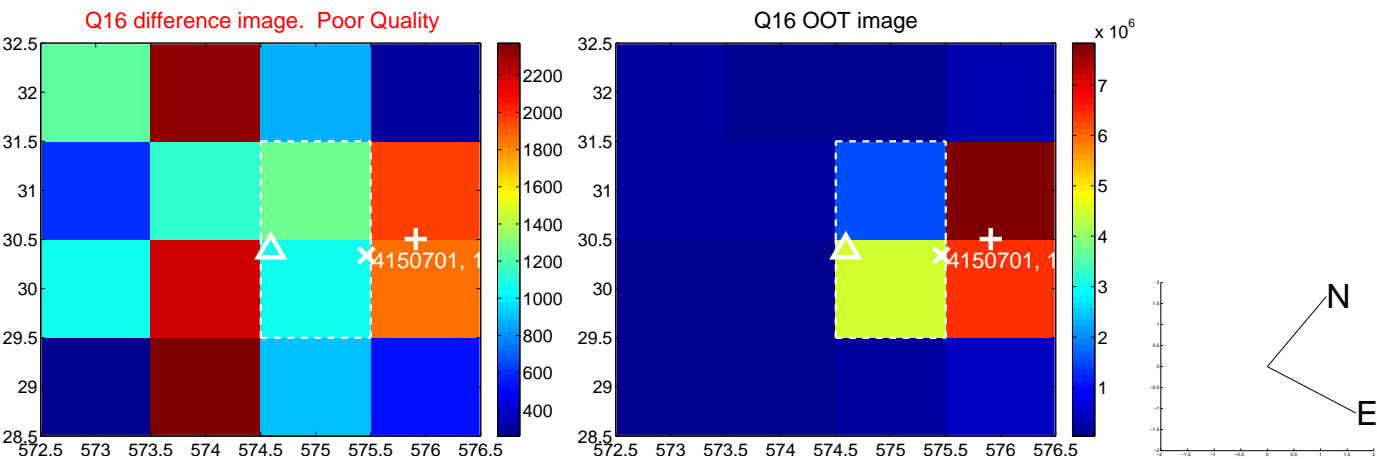
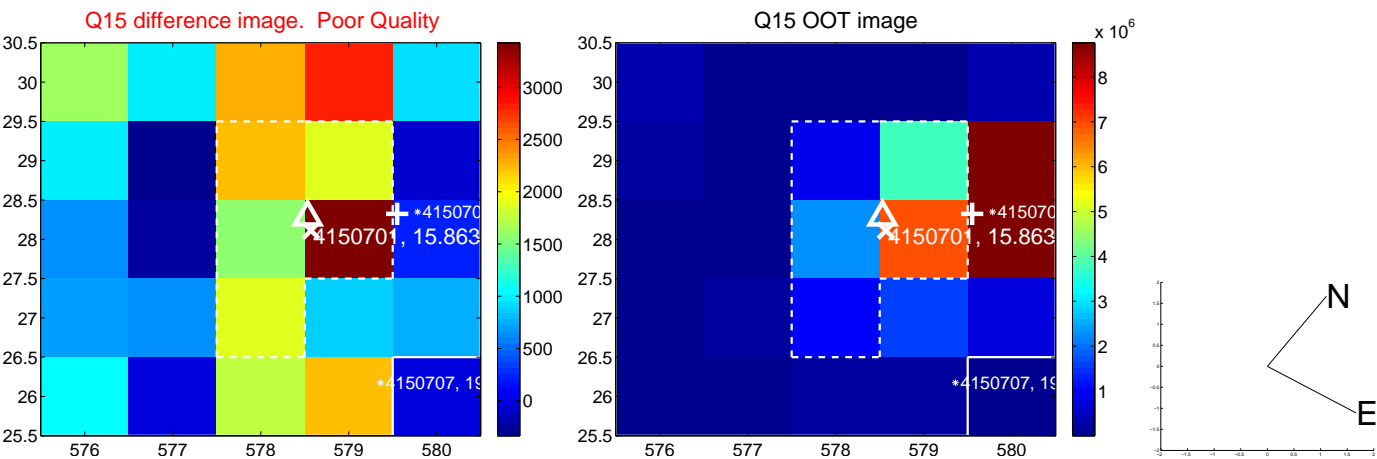
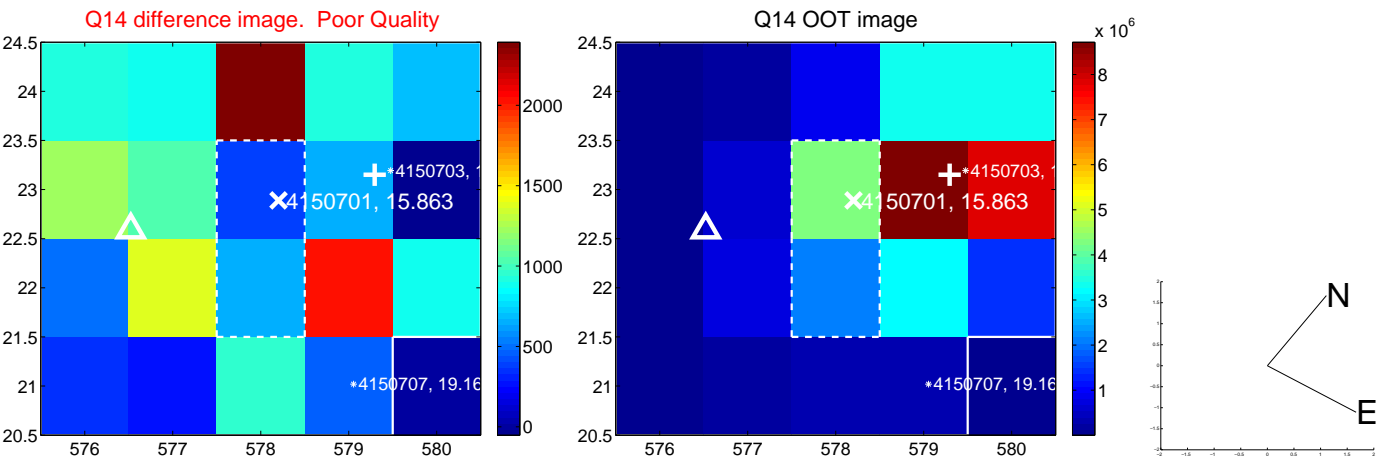
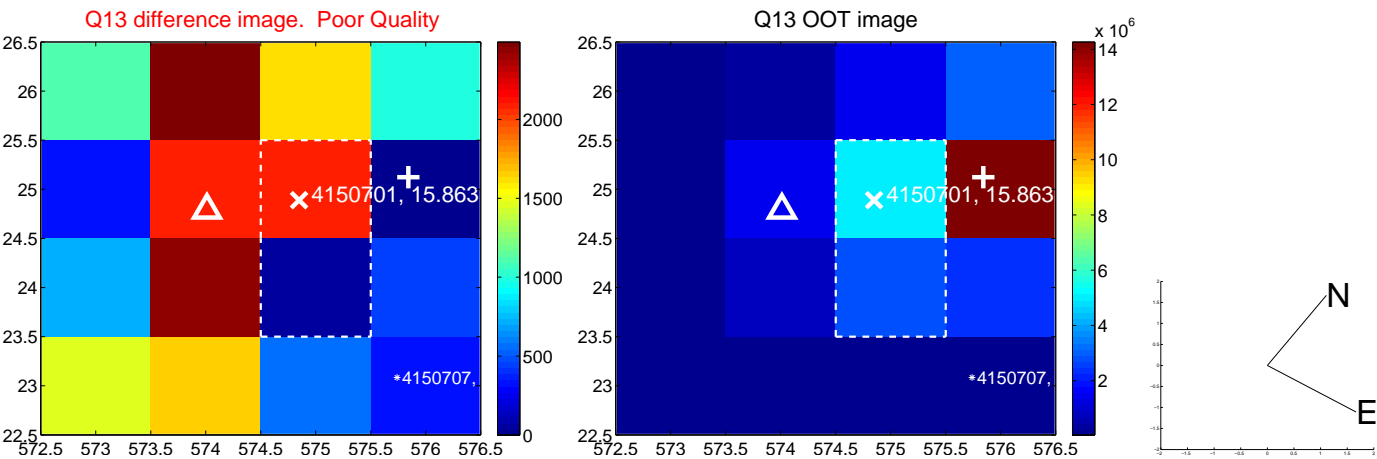
white \times : KIC target position; +: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



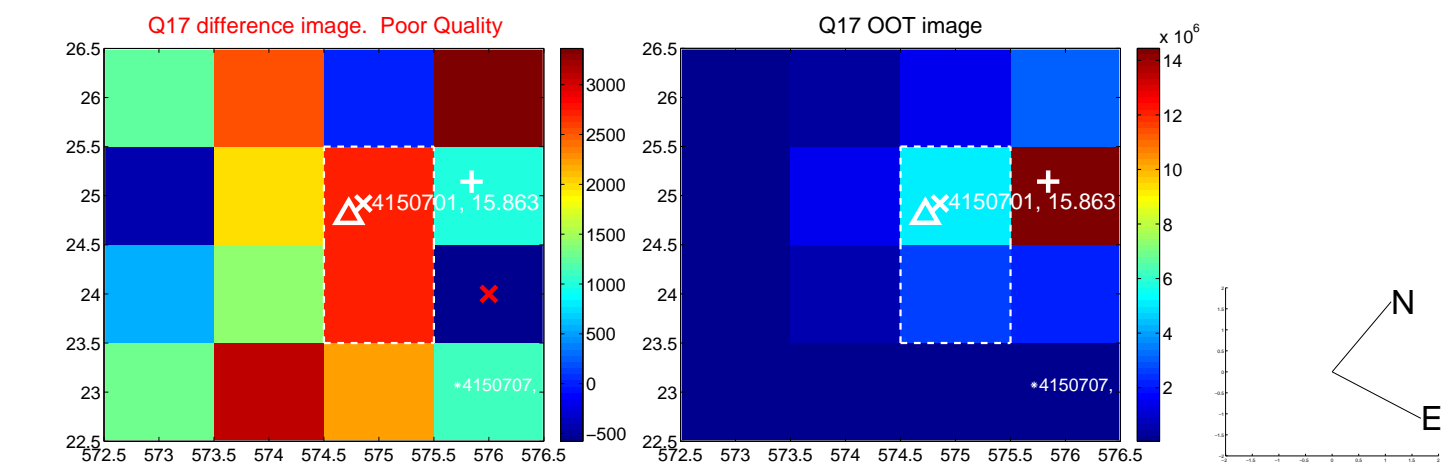
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



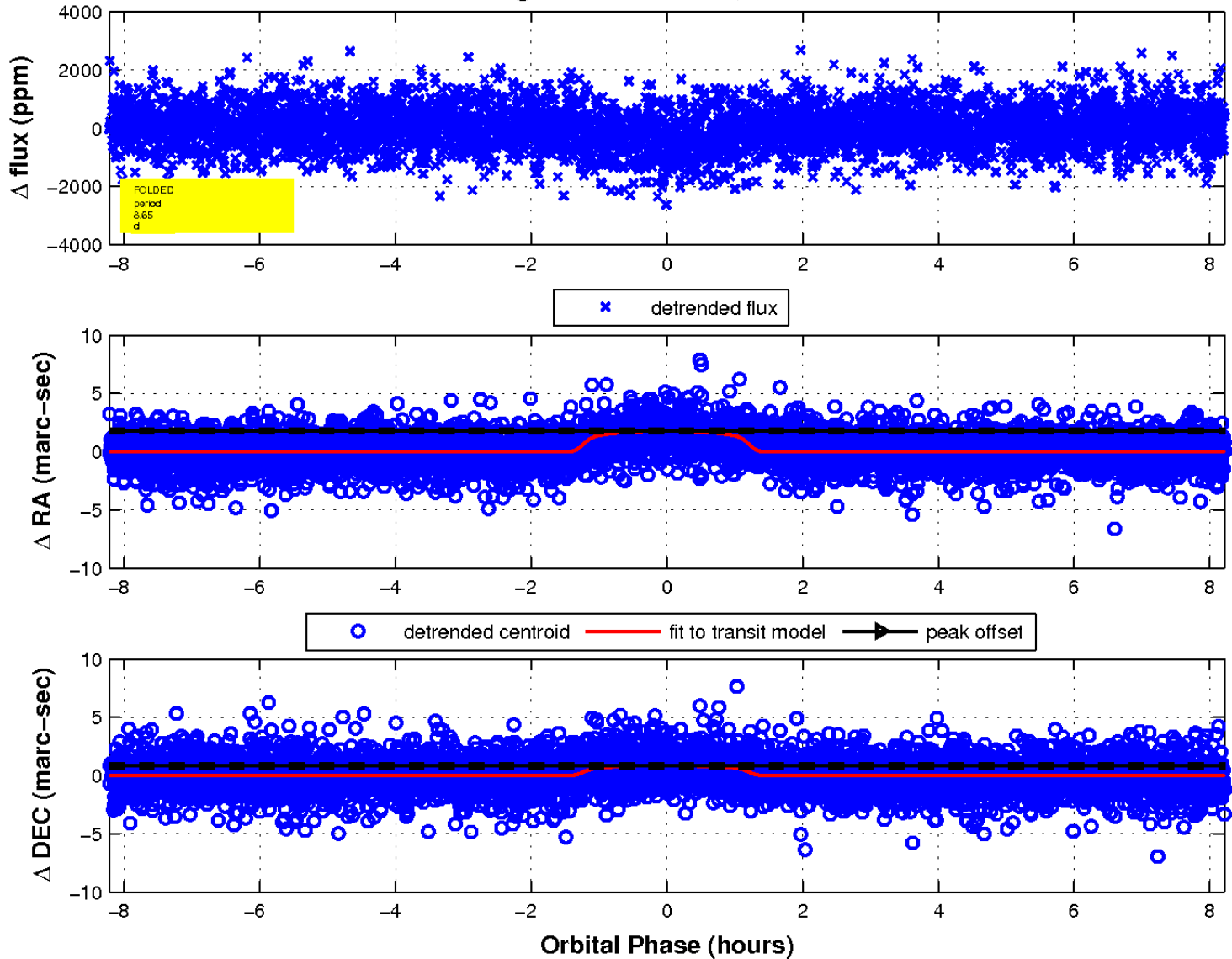
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.

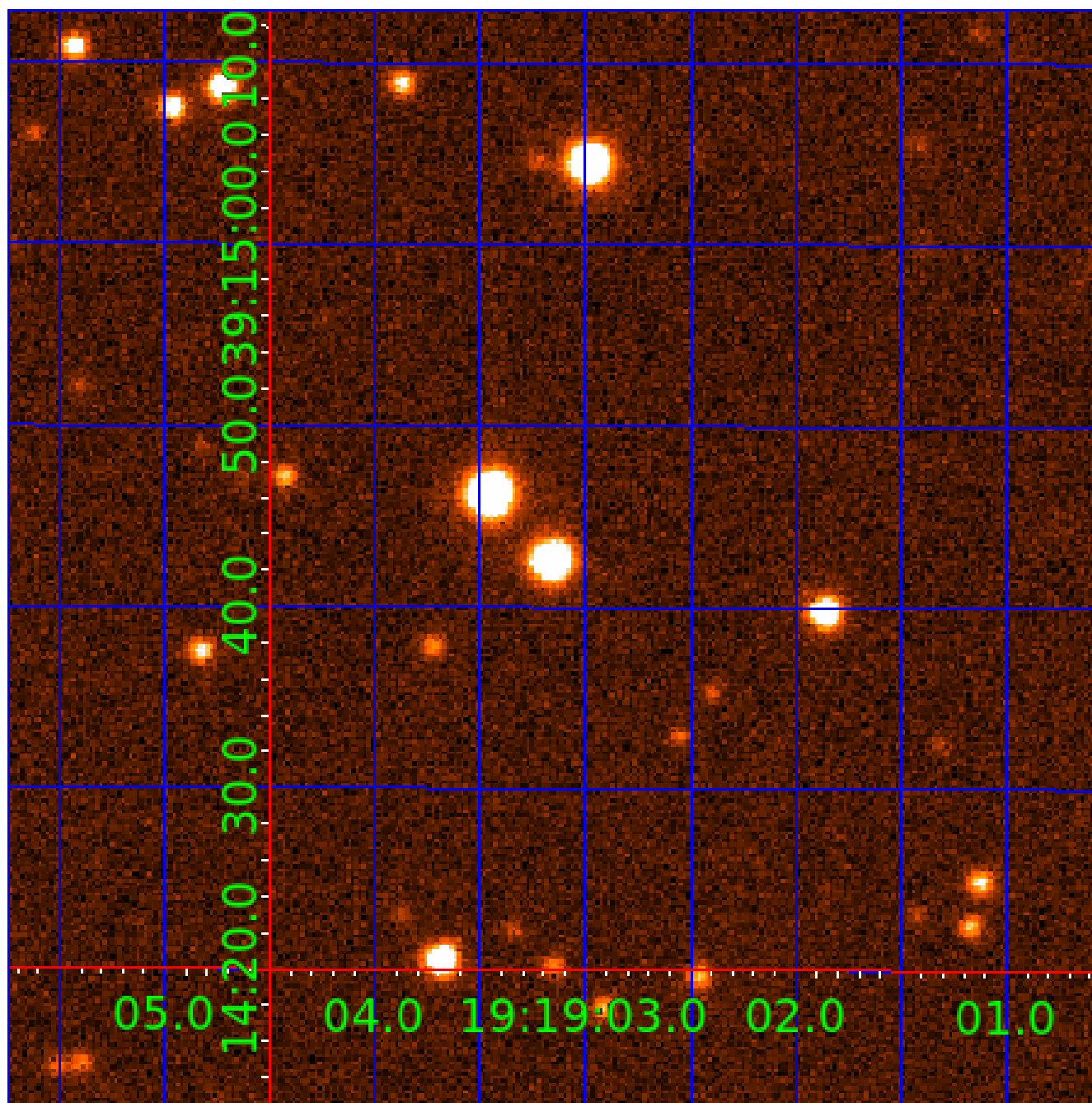


fluxWeightedCentroids, Planet 1 of 2



UKIRT Image

Declination



KIC 004150701

Q1-17 DR25 TCE Parameters

TCE	Run Type	KOI?	Period (Days)	Epoch (BKJD)	Depth (ppm)	Duration (Hours)	MES	SNR	R_{\star} (R_{\odot})	T_{\star} (K)	R_p (R_{\oplus})	S_p (S_{\oplus})
004150701-01	OBS	6110.01	8.653223	134.291394	447.7	2.741	12.5	12.9	0.70	4746	1.79	40.59
004150701-02	OBS	No	8.653143	136.646135	401.7	2.772	12.1	12.0	0.70	4746	1.53	40.59

Robovetter Results

TCE	Run Type	Disp	Score	N	S	C	E	Comments
004150701-01	OBS	FP	0.00	0	1	1	1	MOD_SEC_DV—MOD_SEC_ALT—HAS_SEC_TCE—CENT_KIC_POS—HALO_GHOST—EPHEM_MATCH
004150701-02	OBS	FP	0.00	1	1	1	1	IS_SEC_TCE—CENT_KIC_POS—HALO_GHOST—EPHEM_MATCH

Notes: OBS = Observed. INJ = Injected. INV = Inverted. SCR = Scrambled.

N = Not Transit-Like. S = Stellar Eclipse. C = Centroid Offset. E = Ephemeris Match.

See http://exoplanetarchive.ipac.caltech.edu/docs/API_kepcandidate_columns.html#proj_disp_col for comment definitions.

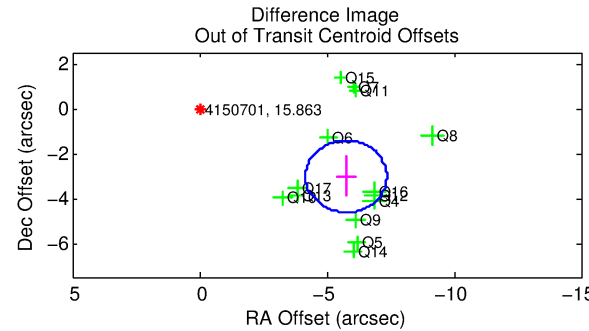
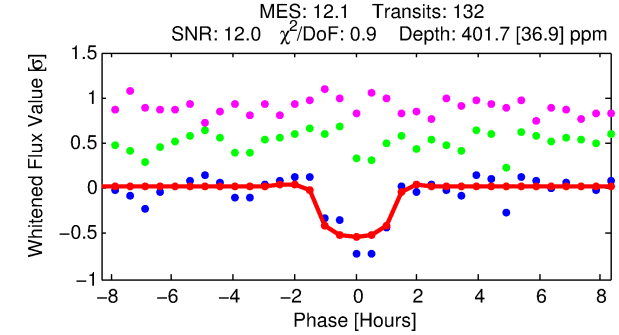
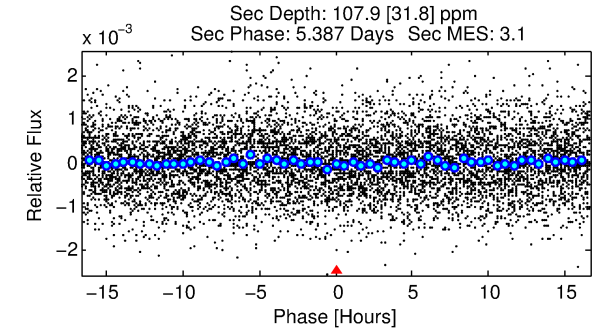
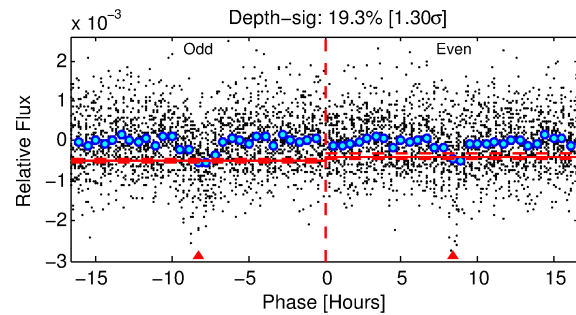
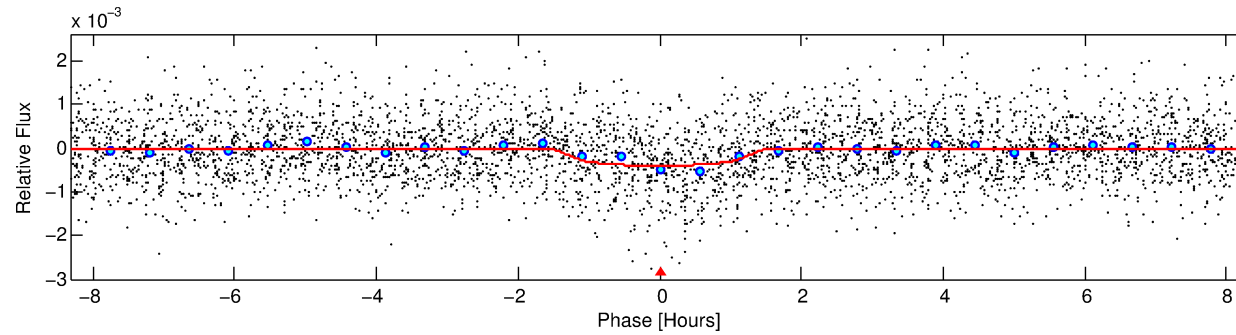
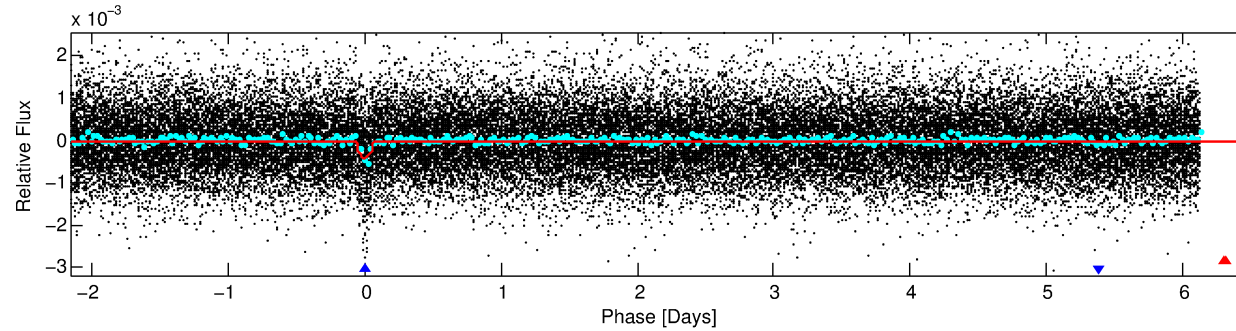
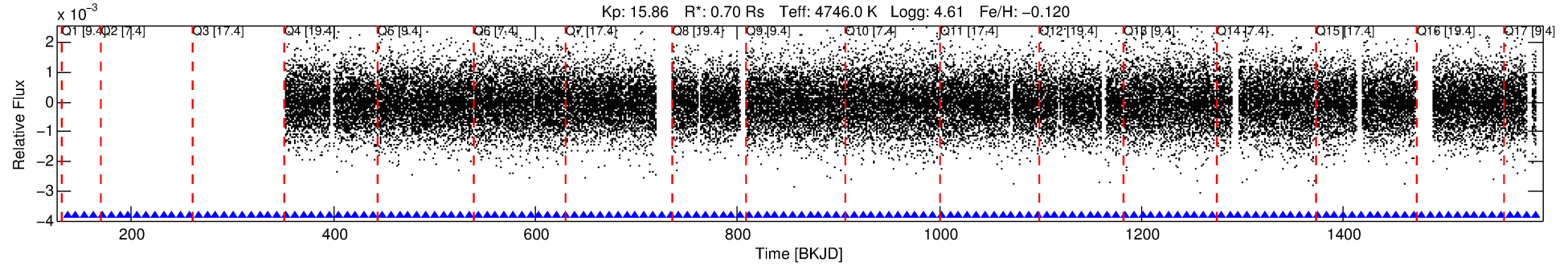
Ephemeris Match Information For 004150701-02

TCE (1)	KIC	Parent (2)	Parent KIC	$P_1:P_2$	Dist (μ)	Δ Row	Δ Col	m_2	m_1	D_2/D_1	Mechanism	Flag	σ_P	σ_T
004150701-02	4150701	004150611-01	4150611	1:1	97.5	-24	1	7.90	15.86	144.46	Direct-PRF	0	0.04	0.30

Notes: $P_1:P_2$ is the period ratio. Dist is the distance in arcseconds. Δ Row and Δ Col are the number of pixels apart in row and column. m_2 and m_1 are the magnitudes of the parent and child. D_2/D_1 is the parent's transit depth divided by the child's. σ_P and σ_T are the significance of the match in period and epoch. For a match to be considered significant $\sigma_P < 5.0$ and $\sigma_T < 5.0$. Matches which have σ_P and σ_T very close to this cutoff should receive extra scrutiny, especially if the period ratio is very large.

DV One-Page Summary

KIC: 4150701 Candidate: 2 of 2 Period: 8.653 d
KOI: K06110.01 Corr: 0.788



DV Fit Results:

Period = 8.65314 [0.00006] d
Epoch = 136.6461 [0.0059] BKJD
Rp/R* = 0.0201 [0.0199]
a/R* = 16.35 [53.90]
b = 0.76 [1.93]
Seff = 40.59 [6.78]
Teq = 644 [27] K
Rp = 1.53 [1.52] Re
a = 0.0737 [0.0050] AU
Ag = 137.72 [276.10] [0.50 σ]
Teff = 3409 [1711] K [1.62 σ]

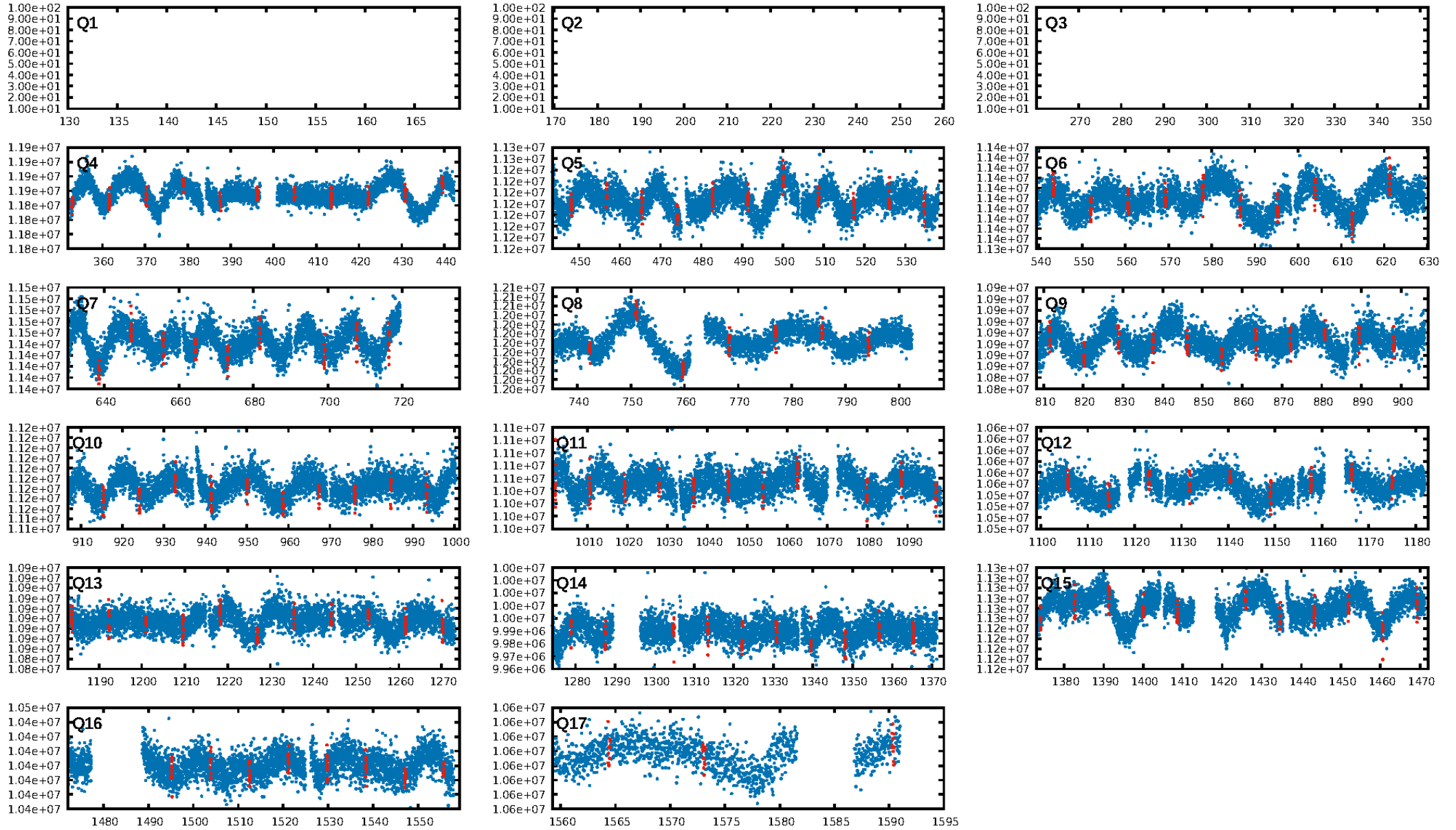
DV Diagnostic Results:

ShortPeriod-sig: N/A
LongPeriod-sig: 0.0% [0.00 σ]
ModelChiSquare2-sig: 13.8%
ModelChiSquareGof-sig: 100.0%
Bootstrap-pfa: 6.95e-33
RollingBand-fgt: 1.00 [129/129]
GhostDiagnostic-chr: -0.03762
Centroid-sig: 0.0%
Centroid-so: 2.086 arcsec [4.94 σ]
OotOffset-rm: 6.504 arcsec [12.19 σ]
KicOffset-rm: 3.667 arcsec [5.57 σ]
OotOffset-st: 3/3/4/4 [14]
KicOffset-st: 3/3/4/4 [14]
DiffImageQuality-fgm: 0.21 [3/14]
DiffImageOverlap-fno: 1.00 [14/14]

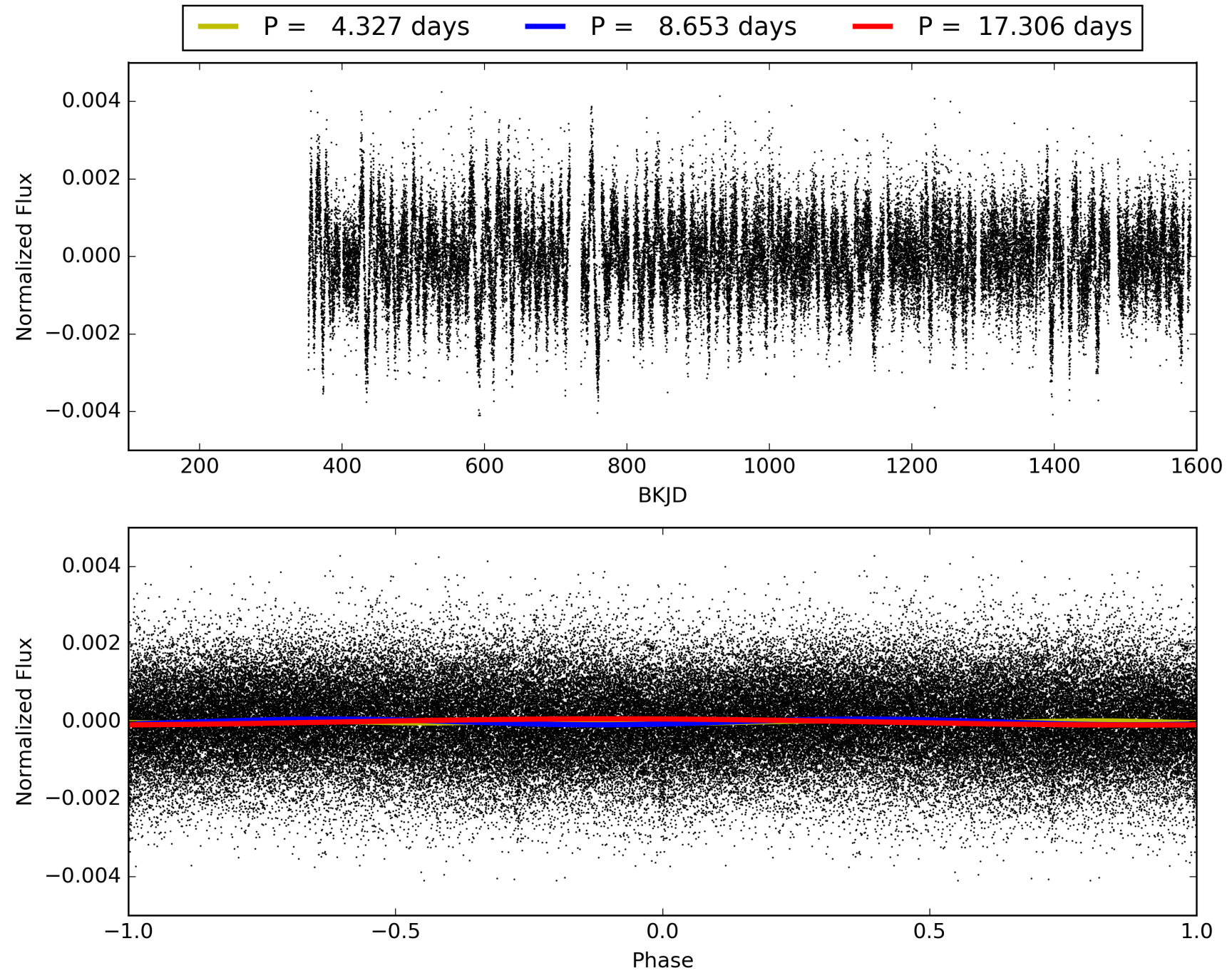
Software Revision: svn+ssh://murzim/repo/soc/tags/release/9.3.42@60958 -- Date Generated: 31-Jan-2016 18:12:16 Z

This Data Validation Report Summary was produced in the Kepler Science Operations Center Pipeline at NASA Ames Research Center

TCE 004150701-02, PDC Light Curves

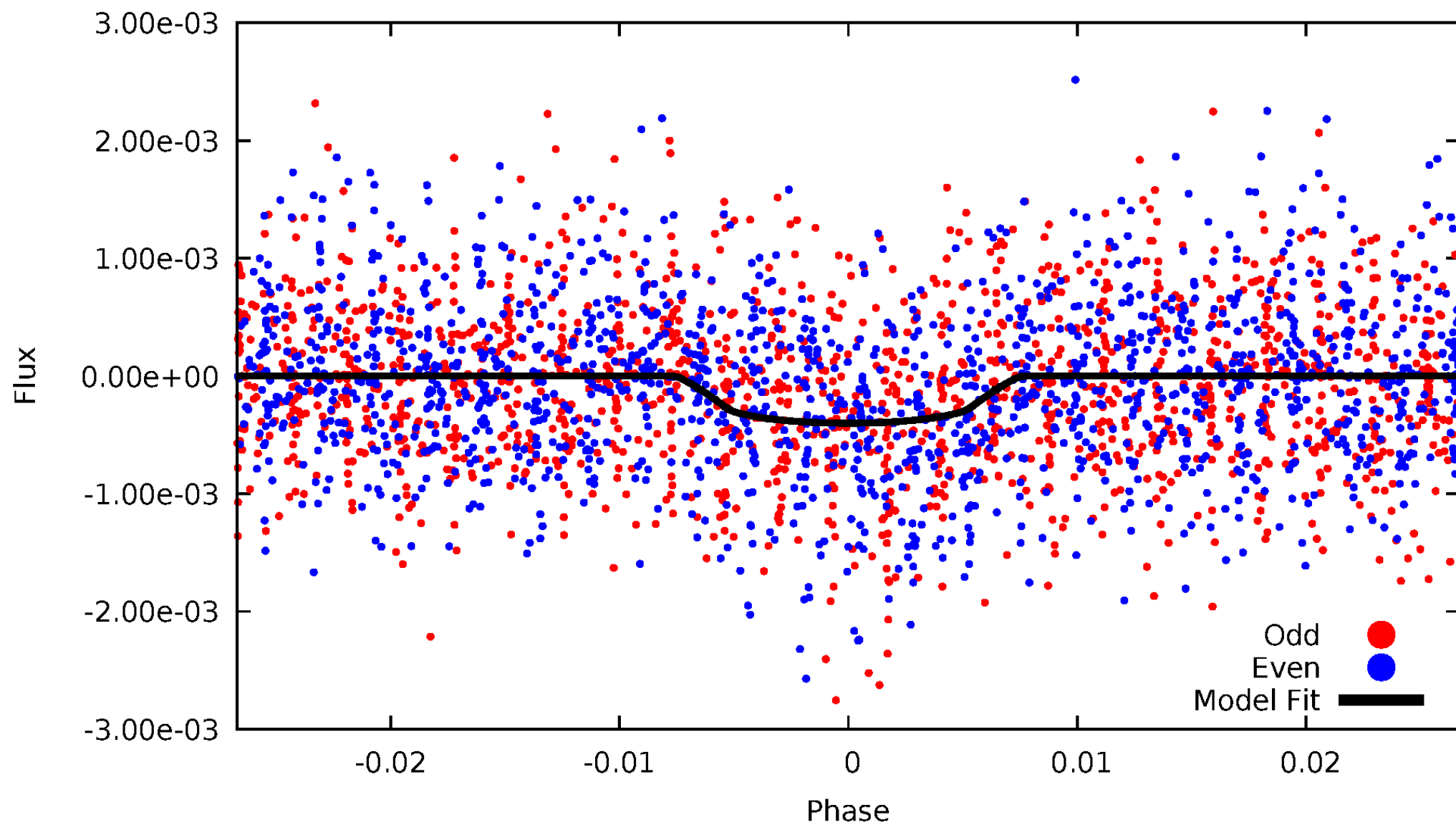


TCE 004150701-02



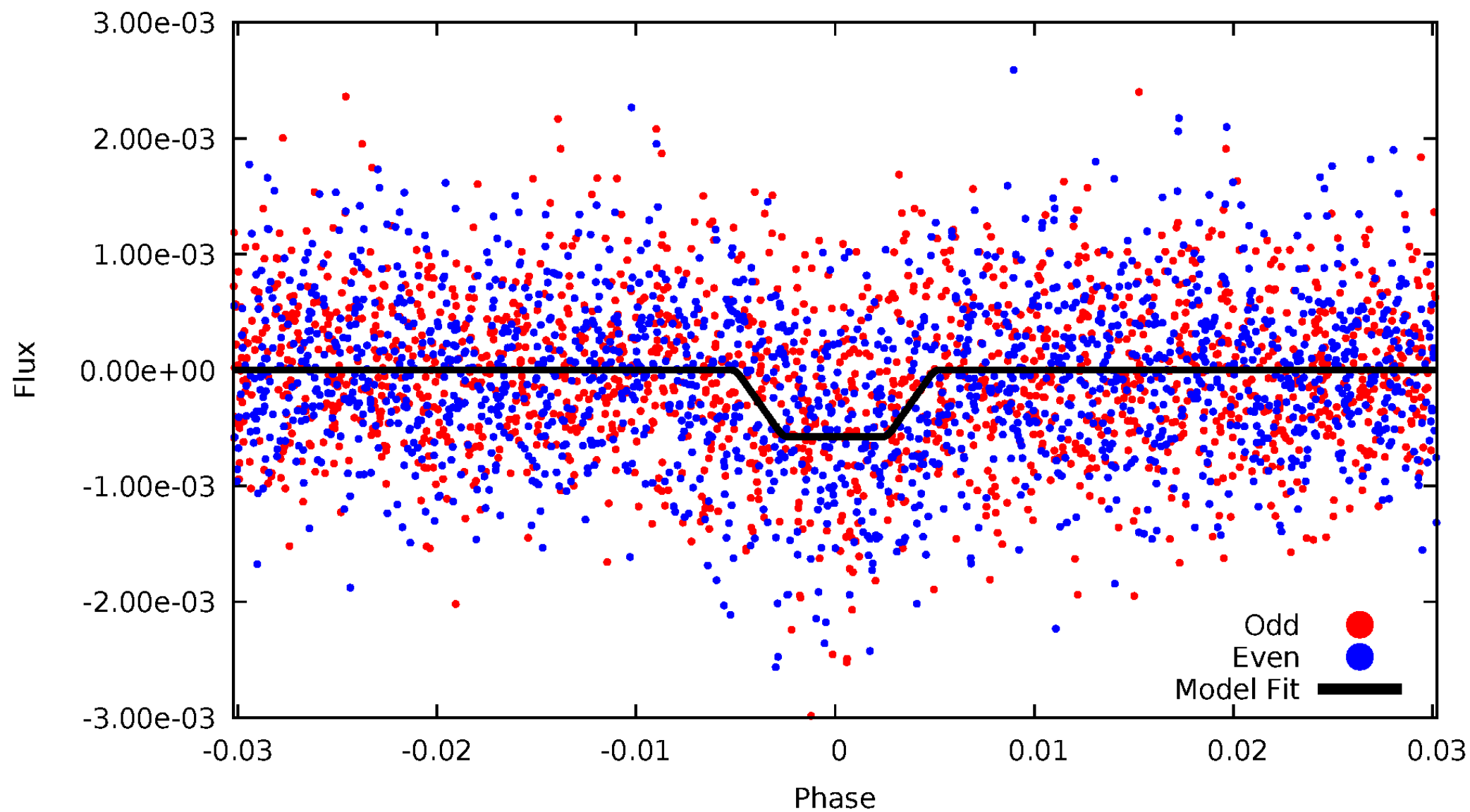
DV Odd/Even

TCE 004150701-02



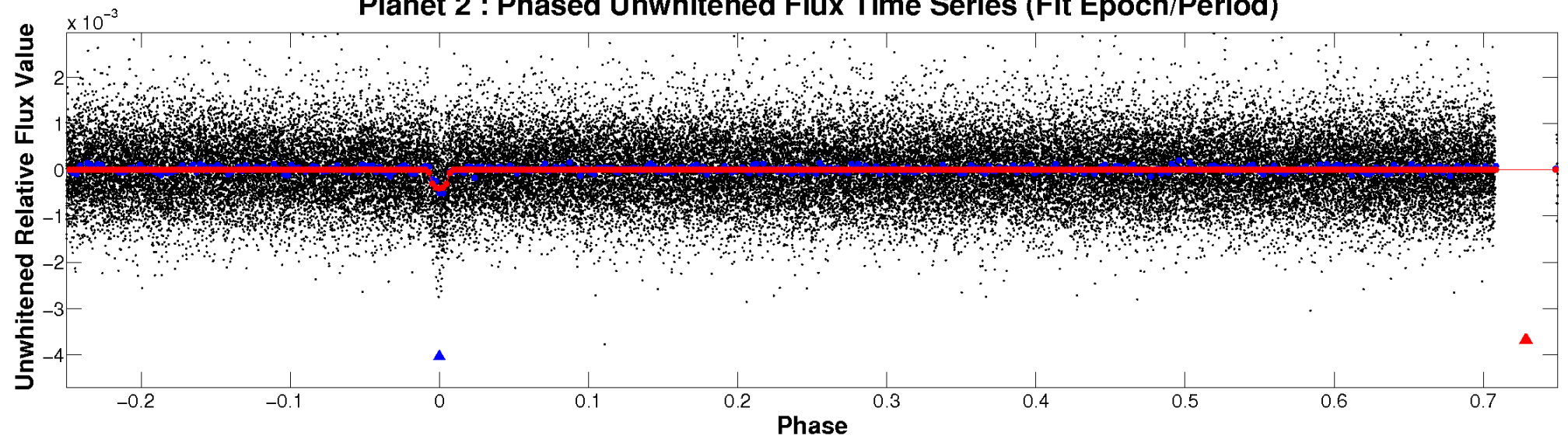
ALT Odd/Even

TCE 004150701-02

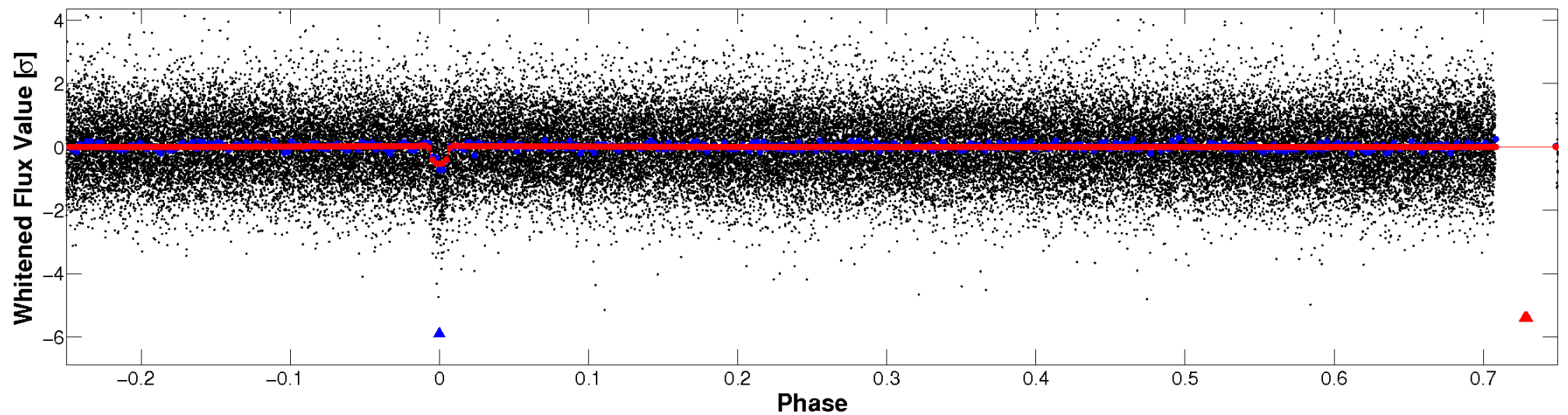


Non-Whitened Vs. Whitened Light Curve

Planet 2 : Phased Unwhitened Flux Time Series (Fit Epoch/Period)

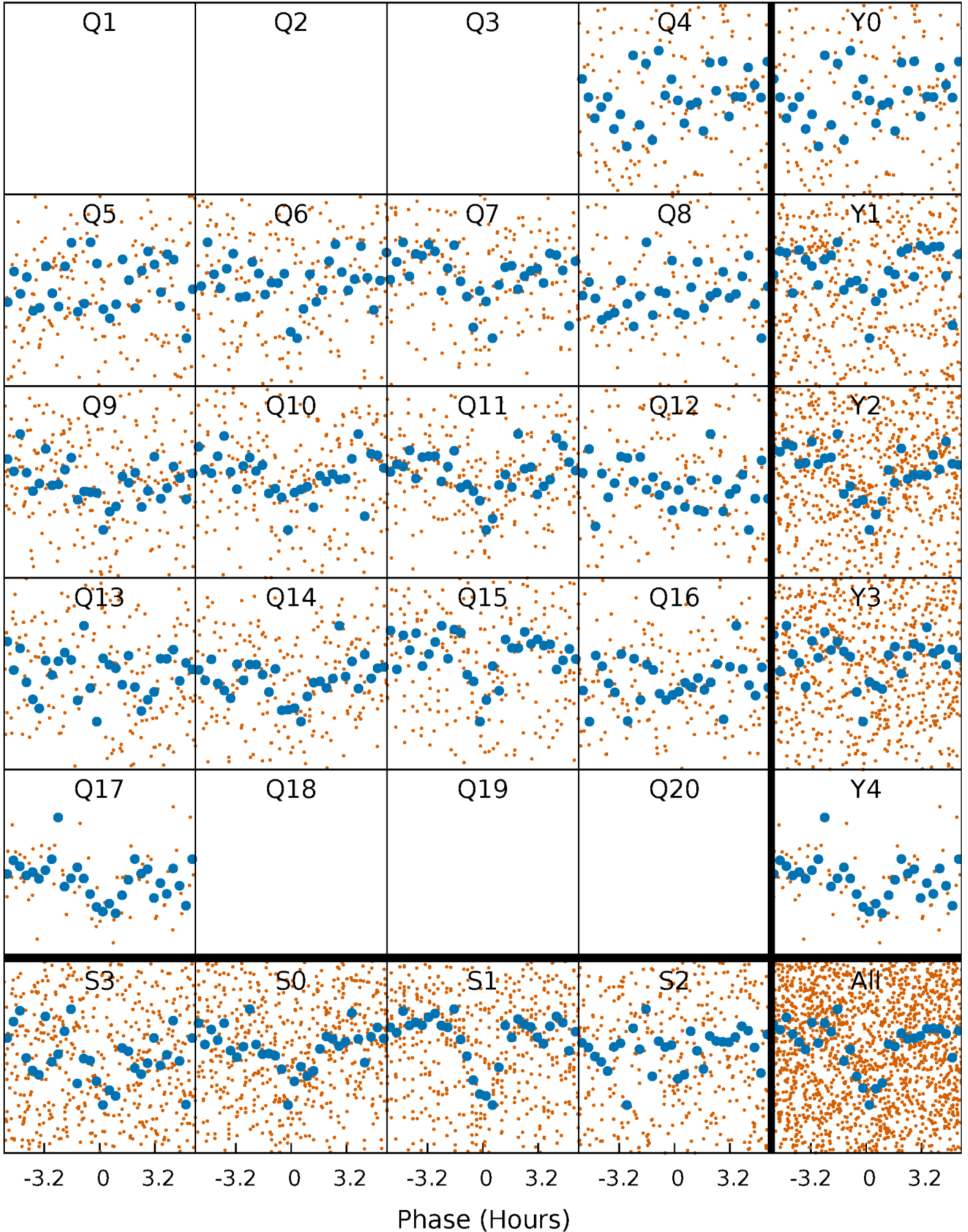


Planet 2 : Phased Whitened Flux Time Series (Fit Epoch/Period)



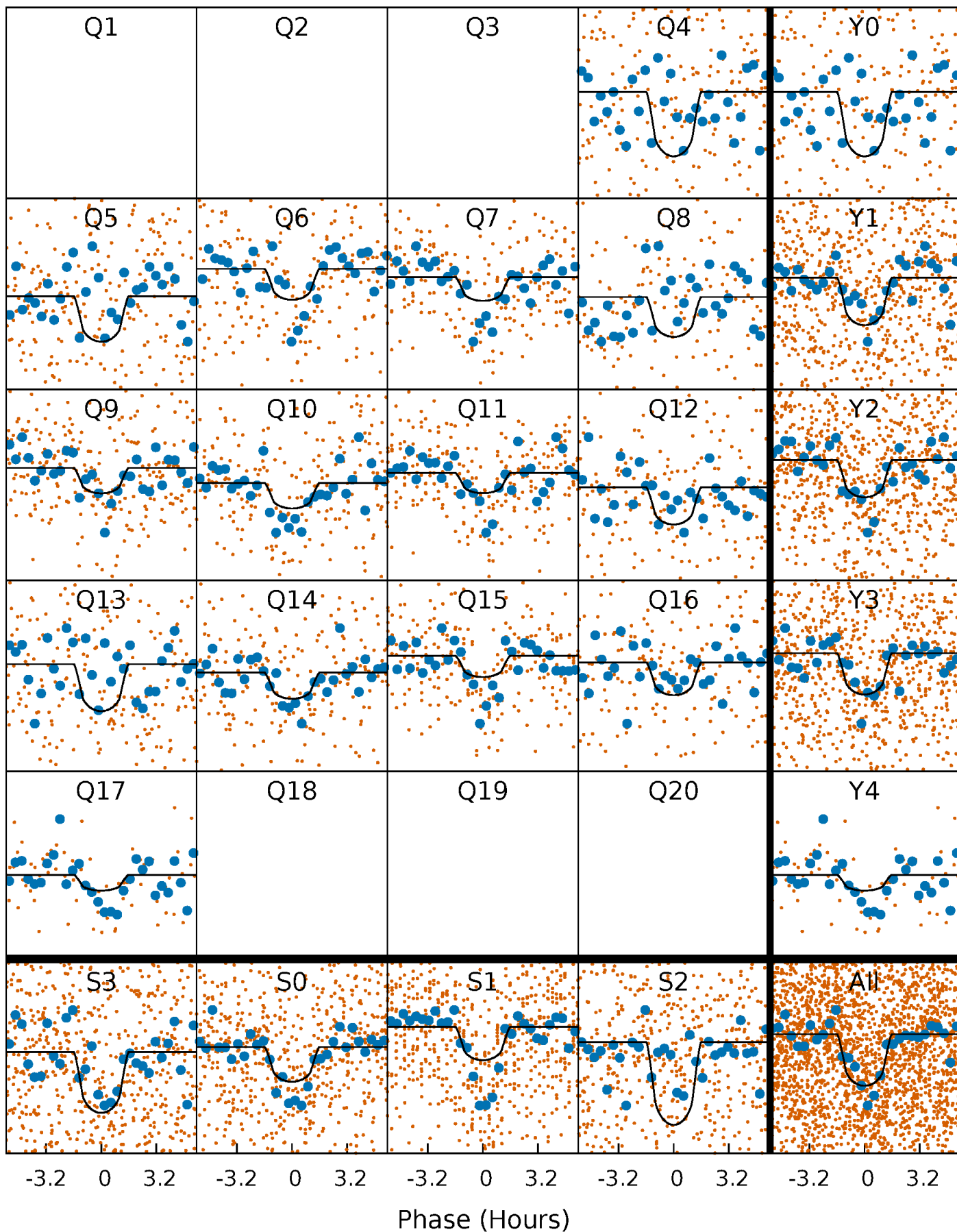
PDC Quarter-Phased Transit Curves

TCE 004150701-02 $P = 8.653143$ Days $T_0 = 136.646136$ (BKJD)



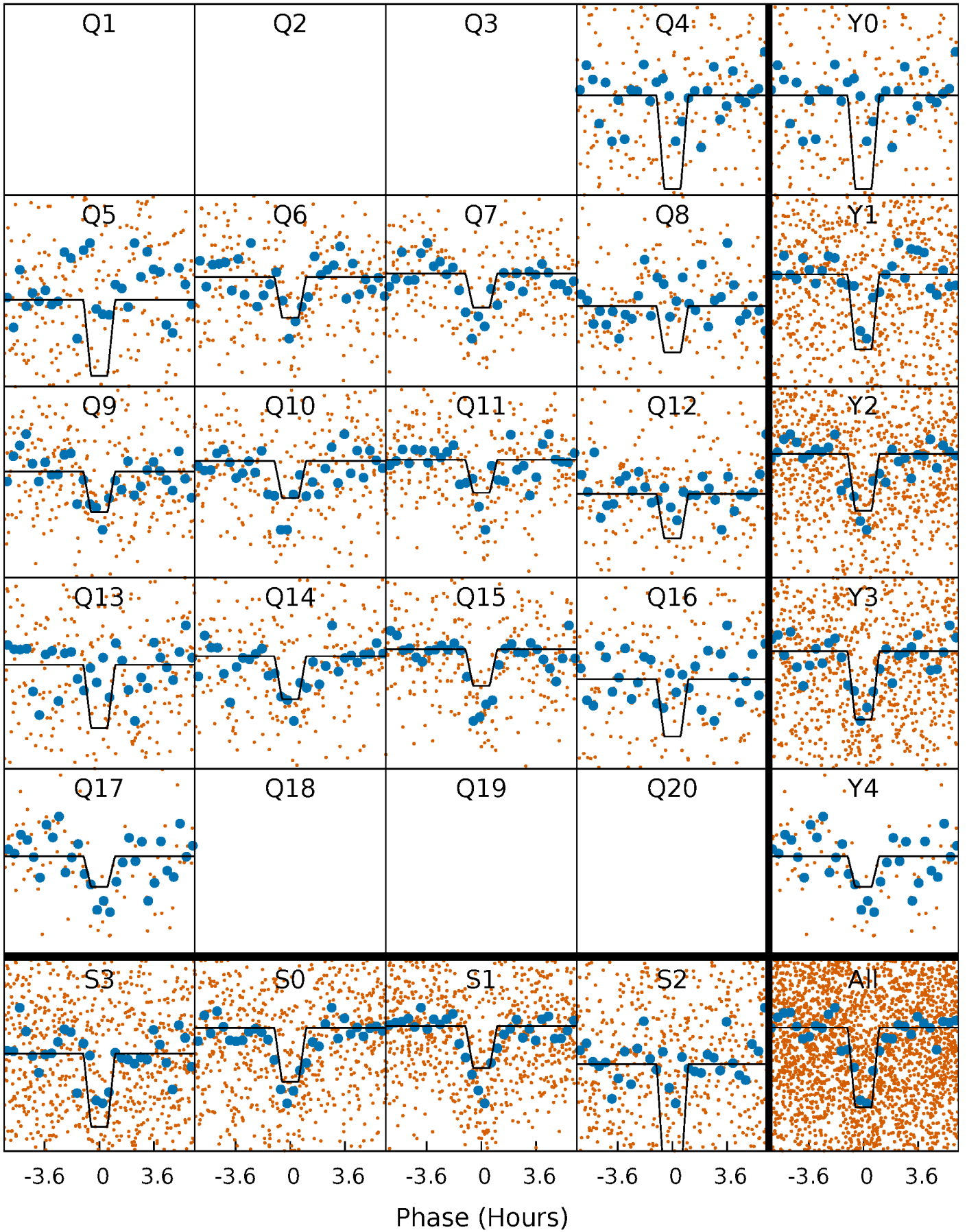
DV Quarter-Phased Transit Curves

TCE 004150701-02 P= 8.653143 Days $T_0=136.646136$ (BKJD)



Alt. Detrend Quarter-Phased Transit Curves

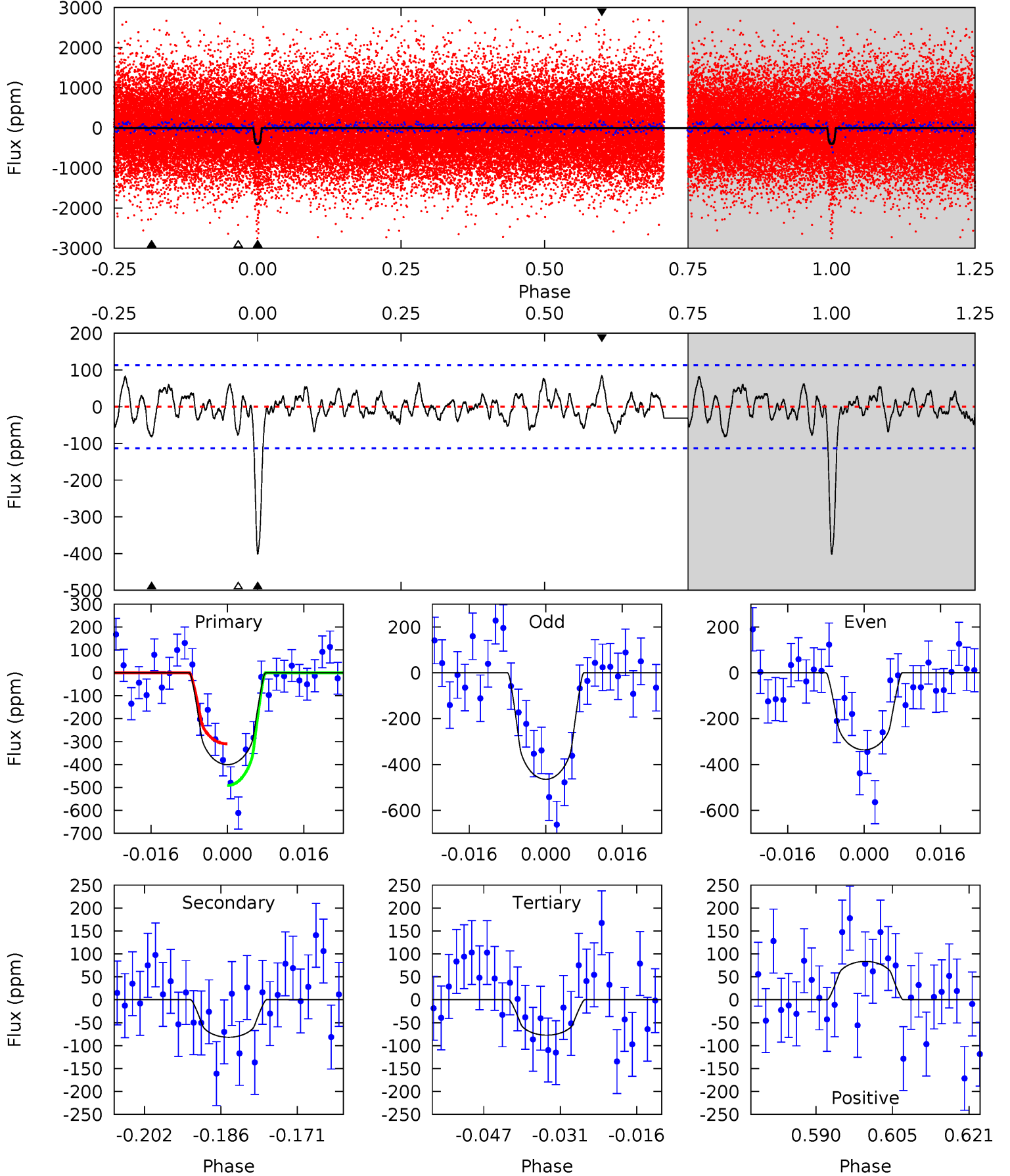
TCE 004150701-02 P= 8.653096 Days $T_0=136.659045$ (BKJD)



DV Model-Shift Uniqueness Test

004150701-02, P = 8.653143 Days, E = 136.646136 Days

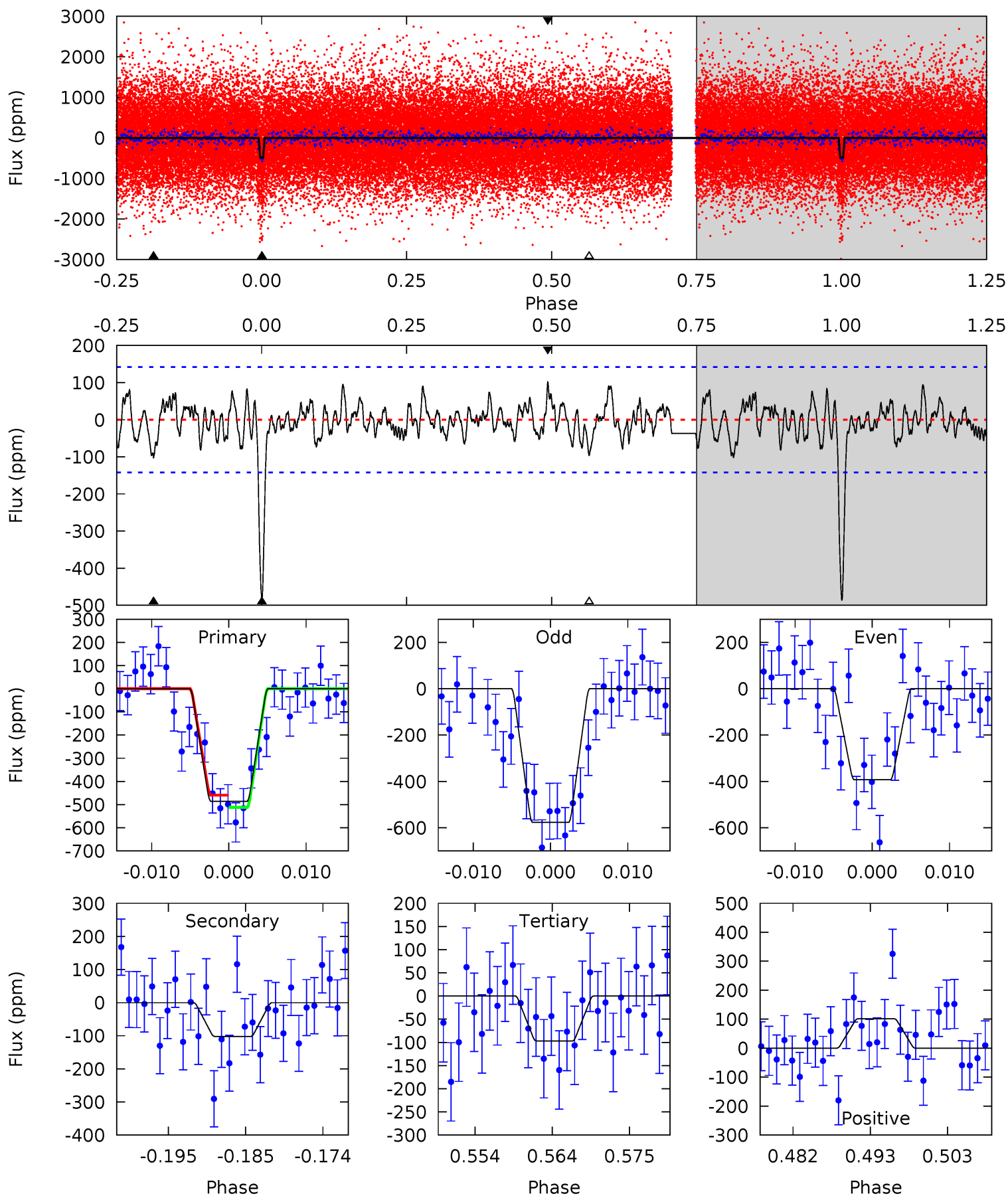
Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.5	3.57	3.37	3.65	4.94	2.42	1.28	14.1	13.8	0.20	-0.08	2.81	0.98	0.17	3.97



Alt Model-Shift Uniqueness Test

004150701-02, P = 8.653096 Days, E = 136.659045 Days

Pri	Sec	Ter	Pos	FA ₁	FA ₂	F _{Red}	Pri-Ter	Pri-Pos	Sec-Ter	Sec-Pos	Odd-Evn	DMM	Shape	TAT
17.2	3.61	3.43	3.59	5.02	2.57	1.26	13.7	13.6	0.17	0.02	3.24	1.05	0.17	0.92



Stellar Parameters For KIC 004150701

	$T_{\text{eff}}(K)$	$\log(g)$	[Fe/H]	$R (R_{\odot})$	$M(M_{\odot})$	$p_{\star} (g \cdot \text{cm}^{-3})$
	4746^{+170}_{-170}	$4.605^{+0.040}_{-0.040}$	$-0.120^{+0.300}_{-0.300}$	$0.696^{+0.063}_{-0.057}$	$0.713^{+0.071}_{-0.065}$	$2.974^{+0.599}_{-0.453}$
	+4%/-4%	+1%/-1%	+250%/-250%	+9%/-8%	+10%/-9%	+20%/-15%
Source	KIC0	KIC0	KIC0	DSEP		

KIC = Kepler Input Catalog; PHO = Photometry; SPE = Spectroscopy; AST = Asteroseismology
 TRA = Transits; DESP = Dartmouth Models; MULT = Multiple Models

Secondary Eclipse Parameters for KIC 004150701-02 / KOI

Detrend	Depth (ppm)	$R_p (R_{\oplus})$	$T_{max} (K)$	$T_{obs} (K)$	A_{obs}
DV	-82 ± 23	$1.86^{+1.30}_{-1.19}$	902^{+37}_{-39}	3341^{+1447}_{-536}	69^{+461}_{-48}
Alt.	-102 ± 28	$2.02^{+1.45}_{-1.25}$	899^{+35}_{-35}	3354^{+1396}_{-525}	72^{+426}_{-49}

T_{max} = Theoretical Maximum Planetary Temperature

T_{obs} = Observed Planetary Temperature (Assuming A=0.3)

A_{obs} = Observed Albedo (Assuming T=0)

If a secondary eclipse is present, the system is likely an EB if $T_{obs} \gg T_{max}$ AND $A_{obs} \gg 1.0$

DV Centroid Data

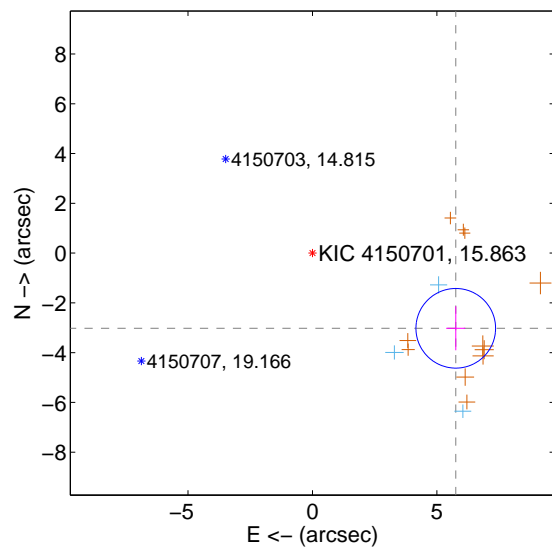
Supplemental centroid analysis for 004150701-02. Kepler magnitude: 15.86. Transit SNR 11.97

There are 3 quarters with good PRF difference image offsets

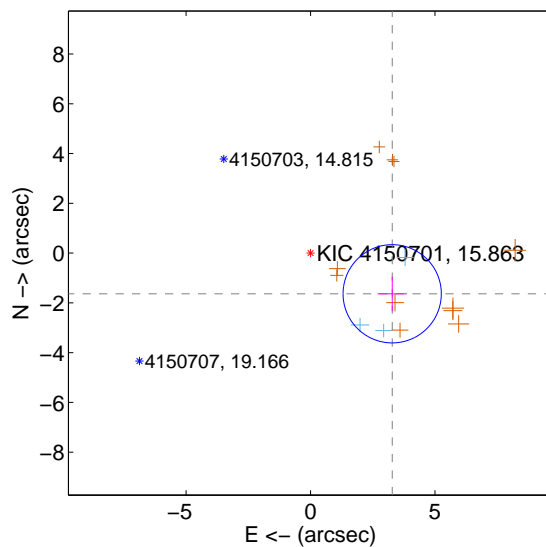
The OOT PRF centroid is offset from the target star catalog position by about 3.99 arcsec so the offset from difference PRF-fit to OOT-fit may be invalid.

	Distance in arcsec	Distance / σ	Δ RA	Δ Dec
PRF-fit source offset from OOT	6.504 ± 0.533	12.19	-5.759 ± 0.384	-3.022 ± 0.884
PRF-fit source offset from KIC position	3.667 ± 0.658	5.57	-3.282 ± 0.590	-1.635 ± 0.690
photometric centroid source offset	2.09 ± 0.42	4.94	-1.93 ± 0.42	-0.78 ± 0.44

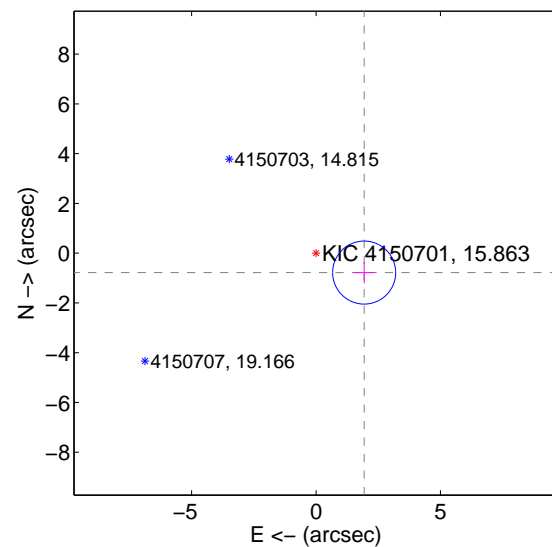
offset from difference PRF-fit to OOT PRF-fit



offset from difference PRF-fit to KIC position

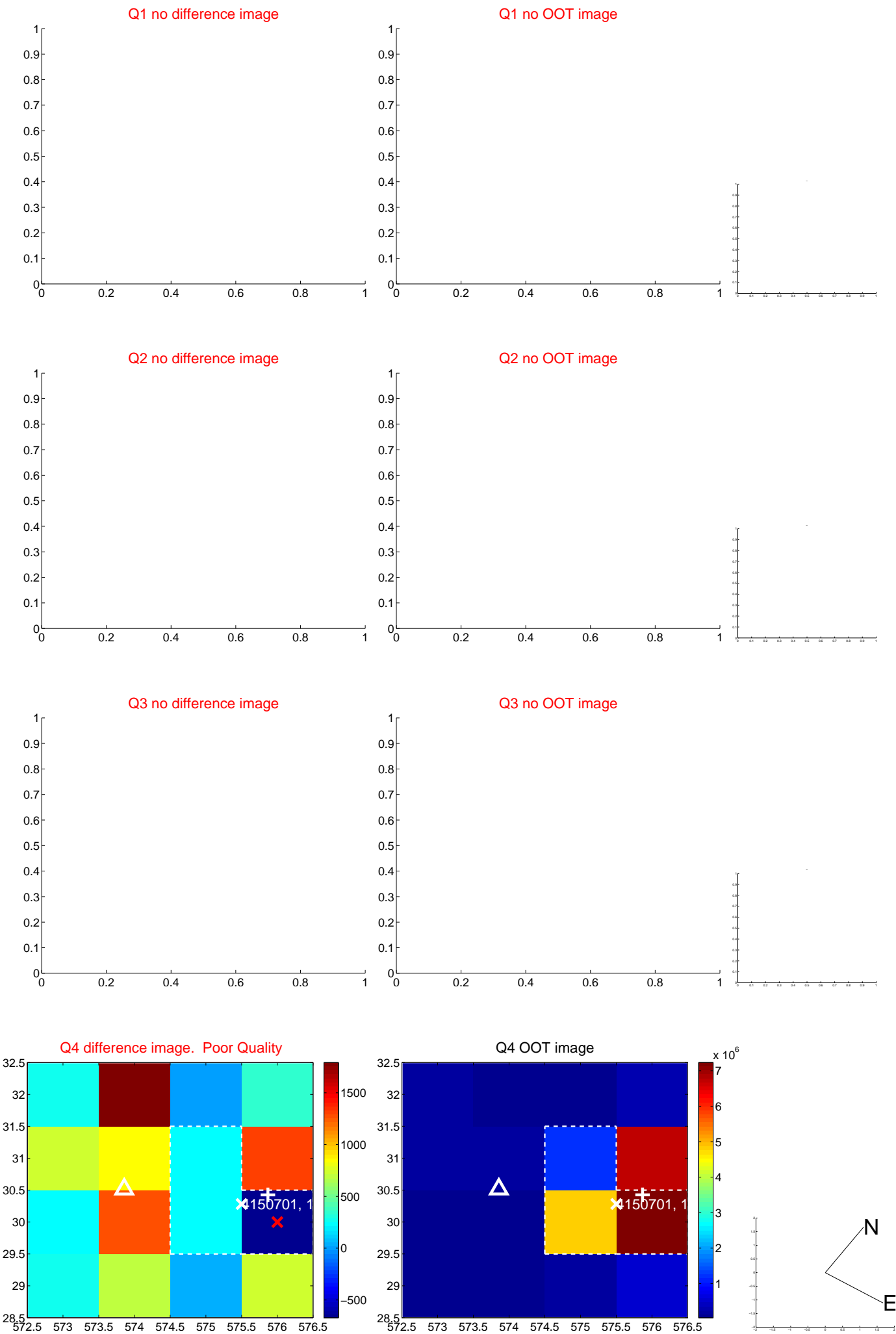


offset from photometric centroids

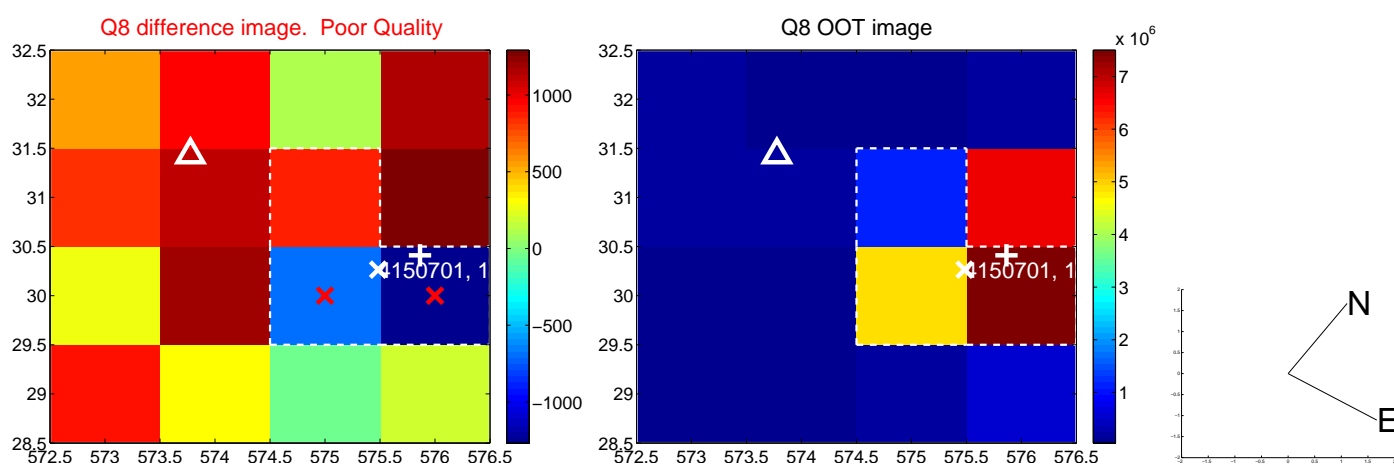
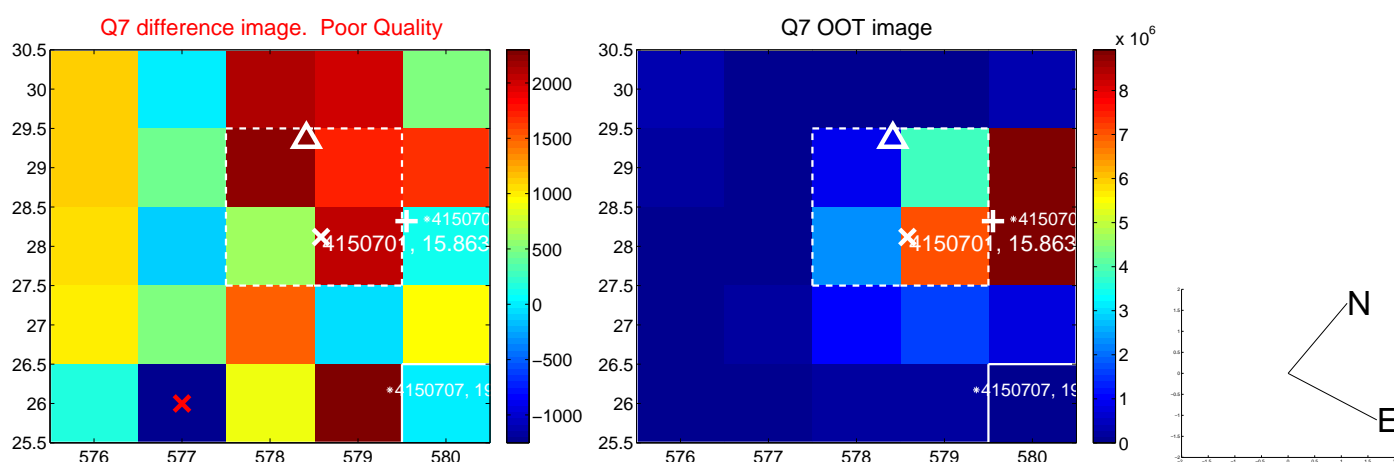
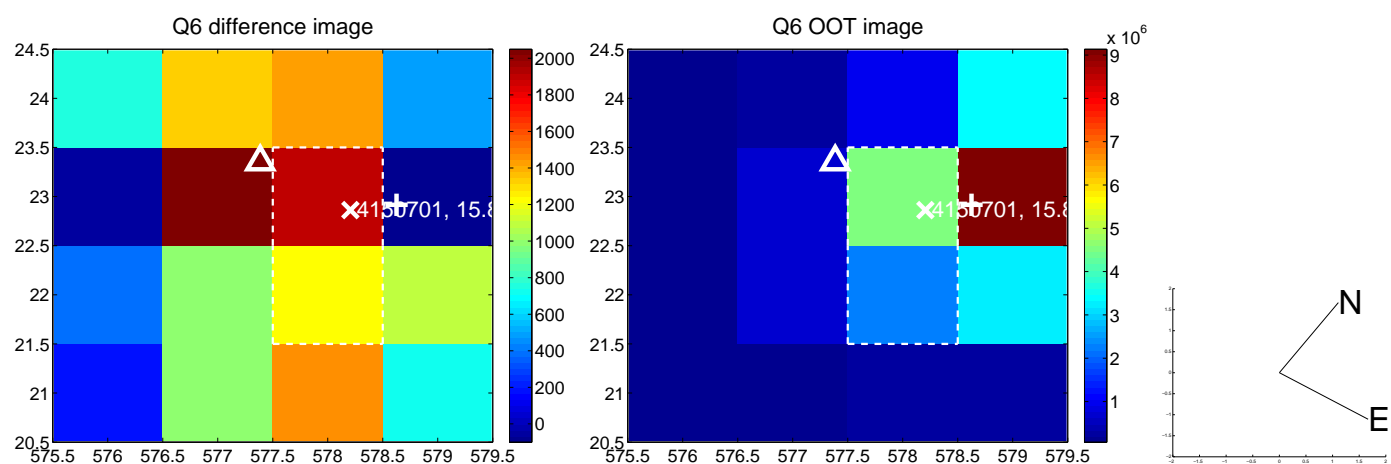
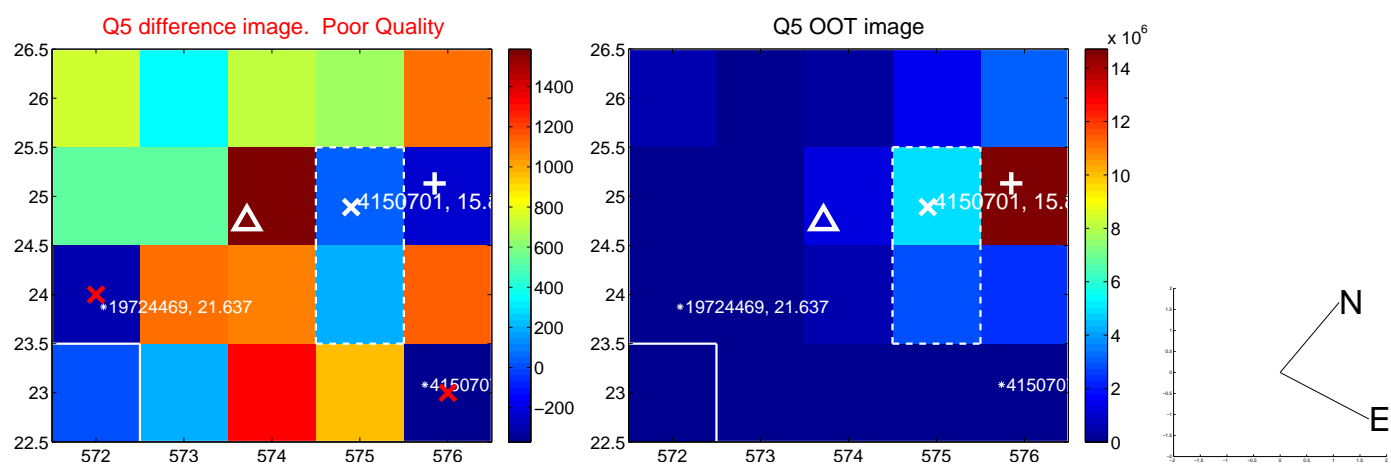


Centroid source offsets from the target star reconstructed from PRF and photometric centroids. **Sky blue crosses: good quarterly centroid offsets; Vermillion crosses: bad quarterly centroid offsets**; magenta cross: average over quarters. Length of the crosses: one- σ uncertainty. Blue circle: three- σ . Red *: target star. Blue *: Other stars. Text next to a star gives its KIC ID and kepmag. KIC IDs > 15,000,000 are from the UKIRT catalog.

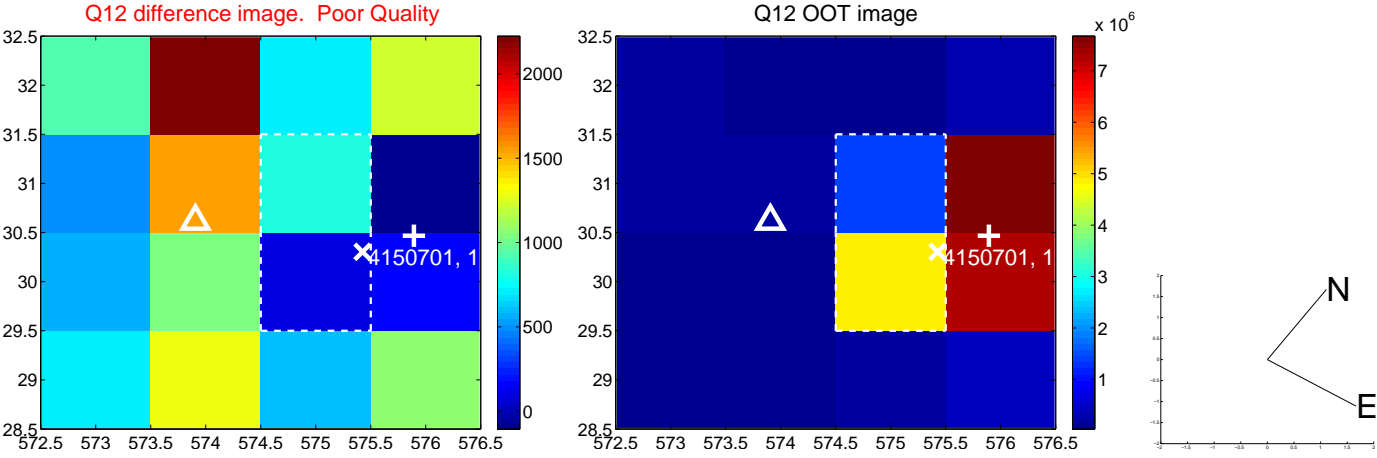
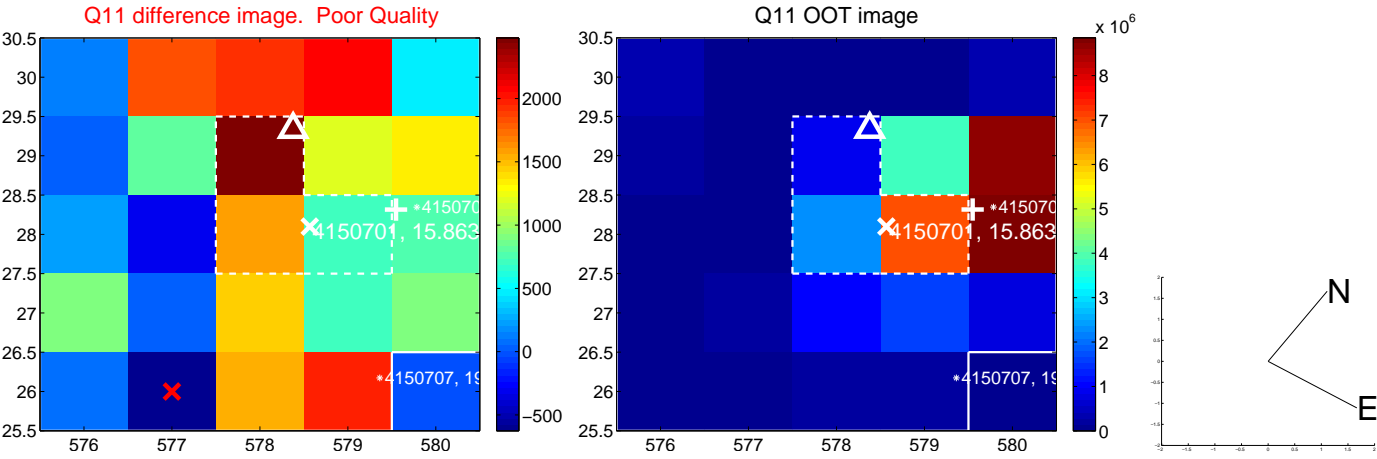
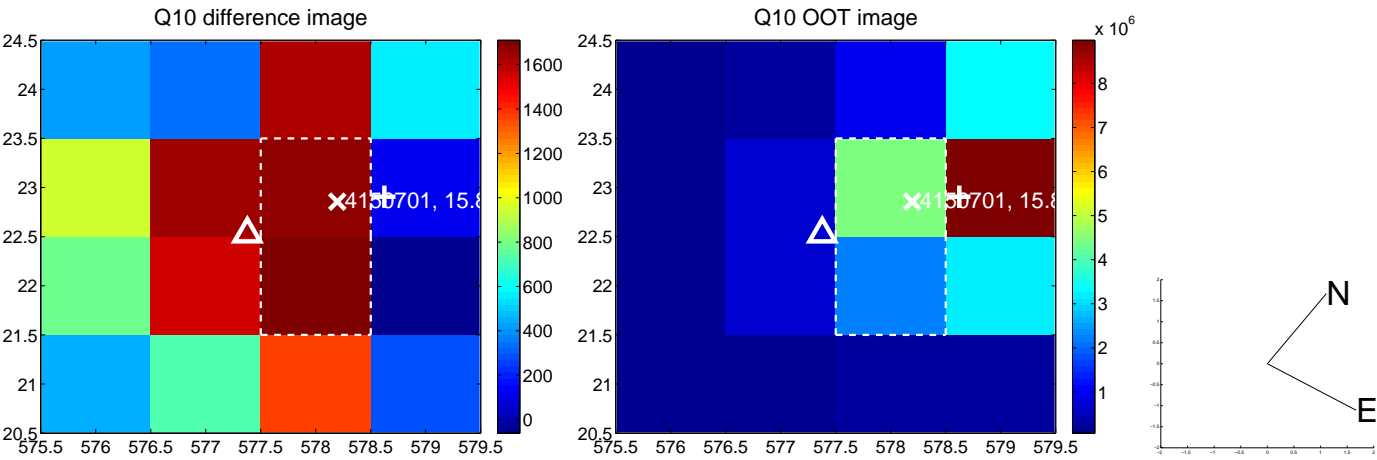
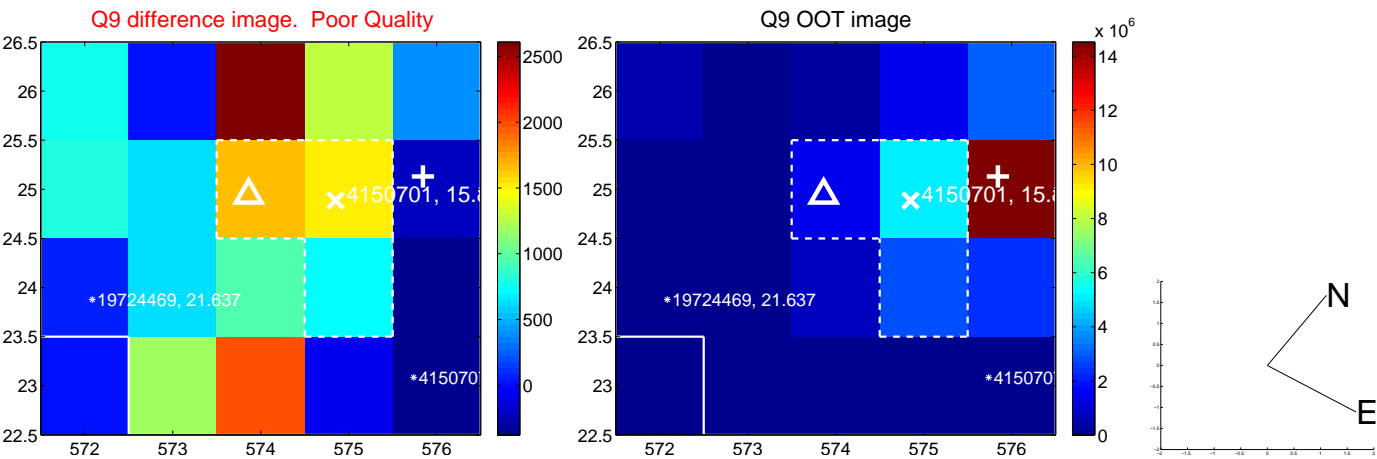
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



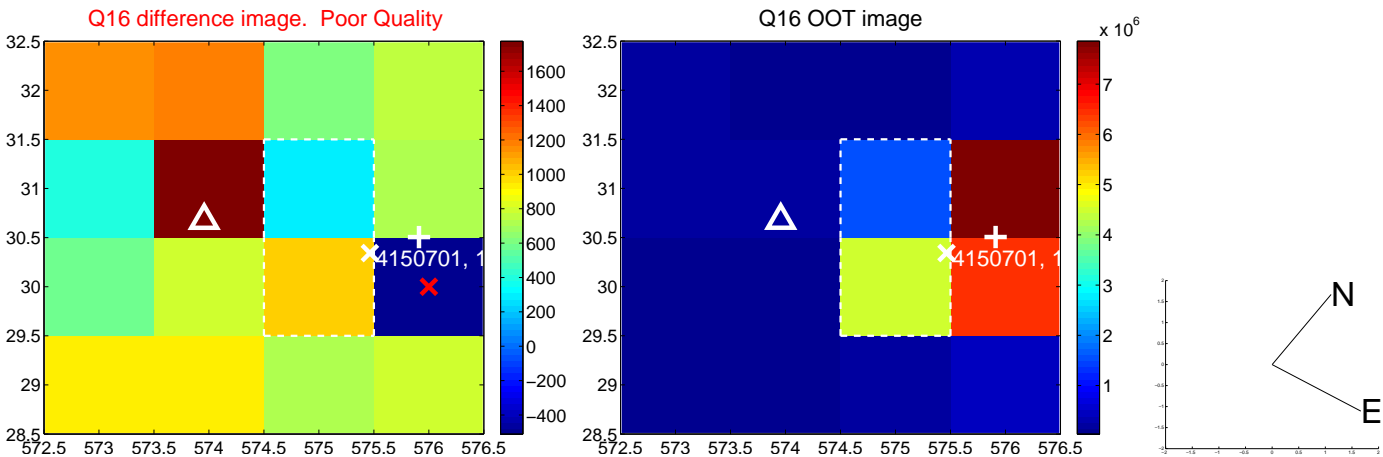
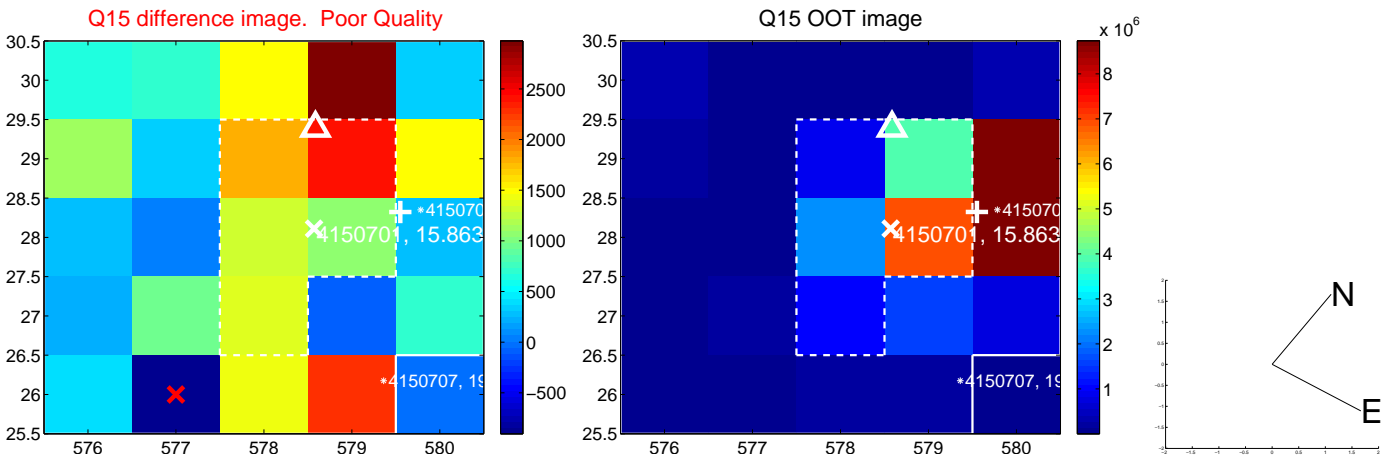
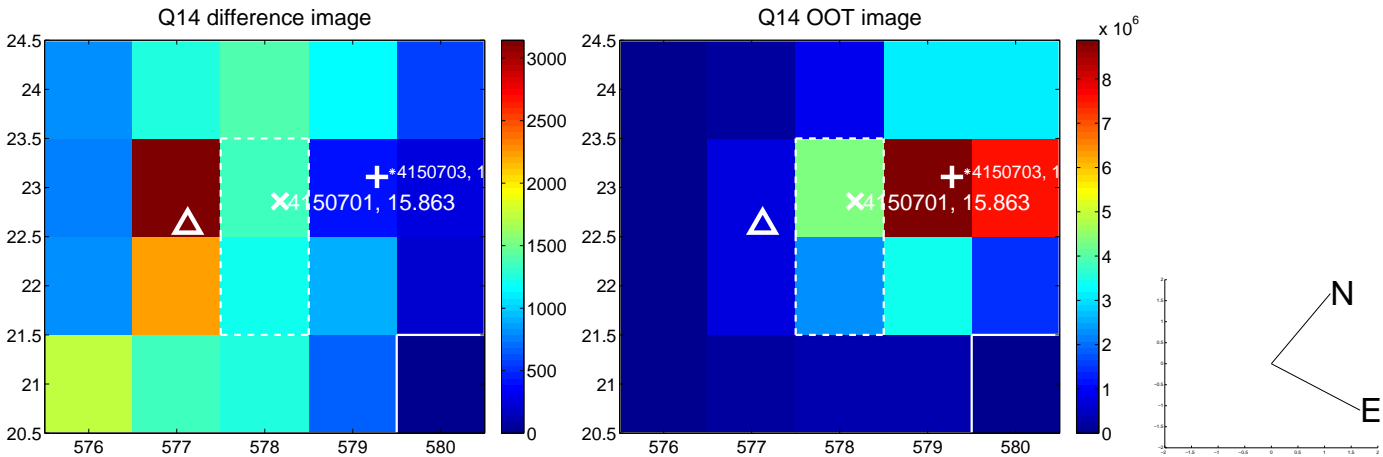
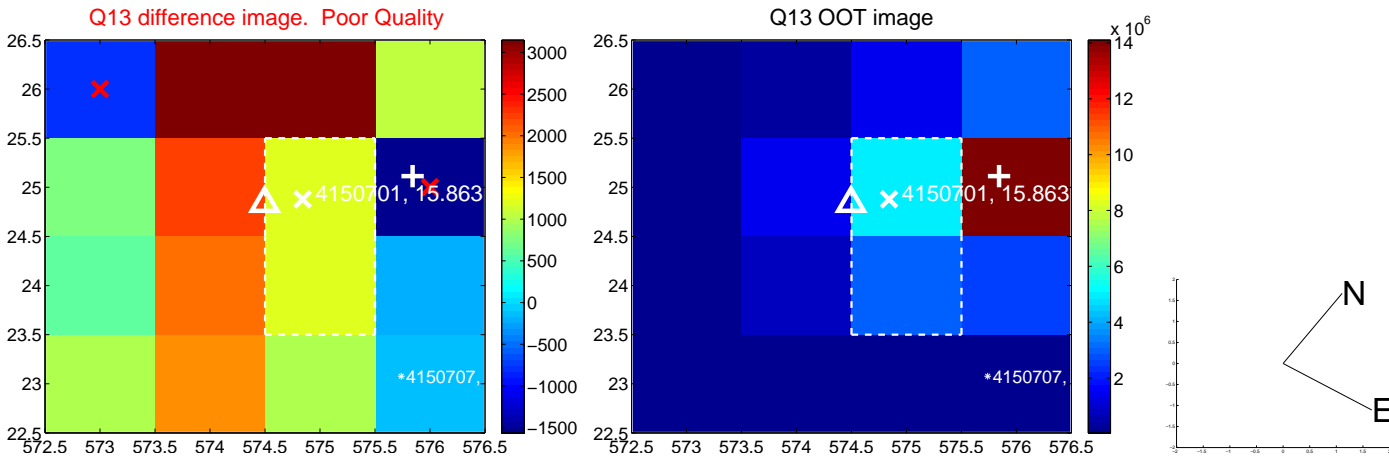
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



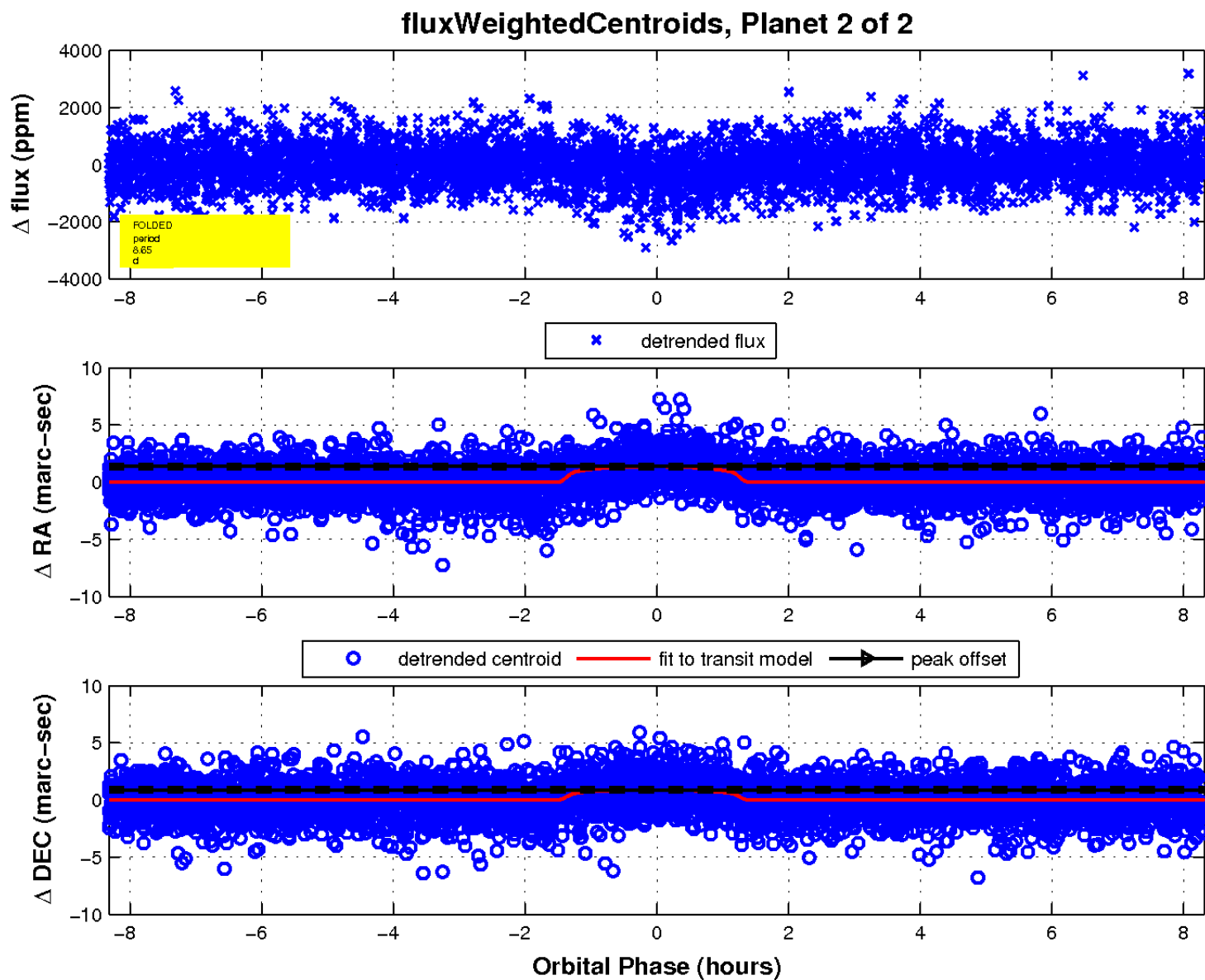
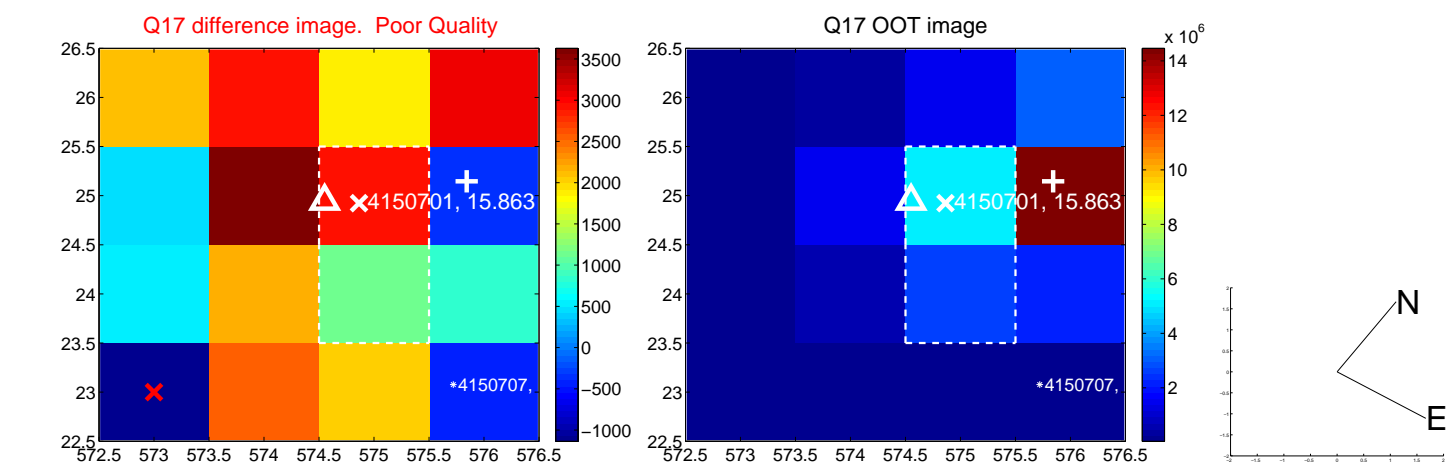
white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; \triangle : difference centroid. red \times : large negative pixel value.



white \times : KIC target position; $+$: OOT centroid; Δ : difference centroid. red \times : large negative pixel value.



UKIRT Image

Declination

